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RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

THE BRITISH AND EASTERN CONTINENTS edition of the Railroad Gazette is published each Friday at Queen Anne's Chambers, Westminster, London. It contains selected reading pages from the Railroad Gazette, together with additional British and foreign matter, and is issued under the name Railway Gazette.

CONTRIBUTIONS.—Subscribers and others will materially assist in making our news accurate and complete if they will send early information of events which take place under their observation. Discussions of subjects pertaining to all departments of railroad business by men practically acquainted with them are especially desired.

ADVERTISEMENTS.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

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VOL. XLIII., No. 1. FRIDAY, JULY 5, 1907.

We show in another column photographs of some of Governor Hughes' new Public Service commissioners. The formation of the two boards was announced last Friday, only three days in advance of the time when it was necessary for them to commence their duties. A plain characteristic of both the up-state and the New York City commissions is that they have been chosen on purely non-political grounds. The Governor evidently does not regard these commissions as a sailors' snug harbor for worthy politicians, and it is sure that so long as Mr. Hughes remains in office he will keep the ten places filled with the best men he can get to accept the somewhat arduous conditions of service. We have no comment to make as to the special fitness of the men chosen to perform the monumental task at hand. We believe that they will be conservative and that they will earnestly try to drive the team of unruly horses committed to their charge. We venture the prophecy that a great deal of the future state corporation regulation in this country will depend upon the success of their efforts.

While the discussion on rails at the annual meeting of the American Society for Testing Materials was disappointing in that it failed to emphasize specifically the many bad features of present mill practice and bring out any strongly expressed opinions as to how better rails could and should be made, it at least had the effect of forcing a show of hands by the rail makers in the specifications presented for adoption. These specifications, which are printed elsewhere in this issue, were obviously a compromise on the part of the members of the committee representing the railroads. They got all they could get, not all they wanted to get, from the representatives of the rail makers. For the purpose of getting the committee report before the meeting the railroad representatives concurred with the rail makers and signed a specification under which, with present conditions, it is practically impossible to get high quality rails even if the maker adheres rigidly to all the provisions. The time for such action was opportune in the light of other circumstances. The committee on rails of the American Railway Engineering & Maintenance of Way Association has agreed on a specification drawn to give the railroads what they want, regardless of what the steel makers are willing to furnish. The committee on rails of the American Society of Civil Engineers, it is understood, will recommend for future, not present consideration, a redesign of the section for heavy rails, together with rigid requirements as to methods of manufacture. At the coming conference between the rail makers and the committee of the American Railway Association the issue can be sharply drawn by comparing these three specifications, one representing the extreme requirements acceptable to the rail makers; the other two representing the lowest requirements acceptable to the railroads.

We should seize the opportunity that is presented by legislation in other states tending to make further railroad construction there unprofitable, to attract railroad capital to Kentucky. We should offer the equal protection of the law, fair treatment and an assurance that those who are willing to benefit Kentucky by making investments in the state will have the good will of her people.

Does this quotation from a set of resolutions passed by the Louisville Board of Trade June 17 indicate that the tide has turned? Can it be taken to show that the wave of hostility towards corporations in general and railroads in particular has reached the high-water mark and that henceforth the efforts of the agitators will recede gradually, each from the high record made by the one before him? We hesitate to believe that this is the case and yet we feel that the earnest efforts of a few more boards of trade supplemented by the example and precept of a few more governors like Mr. Hughes who know how to veto, would go far towards correcting a very socialistic and dangerous state of the public mind. Why cannot influential and sober minded citizens in every state assemble together as the Louisville Board of Trade has done and put themselves on record in some fashion like the following, which we quote:

This board favors legislation, if such be necessary, to prevent fictitious capitalization while demanding the enforcement of laws to correct corporate abuses, as well as the punishment of those who fail to obey such laws; but it believes that what is now in order and for the interests of the public, as well as for the interests of the railroads, is co-operation between the people of the state and the railroads with a view to the good of both. We believe that if the railroads honestly accept their responsibilities to the public and endeavor to live up to them, then the public should as honestly strive to make the business of the railroads successful and profitable. Public hostility, harsh criticism and drastic legislation can serve no good end.

If this were done, we believe that a little wholesome competition between the states to encourage the development of corporations

would prove a good deal more profitable for all concerned than the present competition to drive them out of business.

In civics there is the familiar adage that "politics makes strange bedfellows." In railroading there ought to be some like proverb to express the strange incongruities that events bring about and especially those events that sometimes attend great railroad mergers. It is, for example, a scant two years since the New York, New Haven & Hartford took in the Ontario & Western. Its uses in the Connecticut legislature were immediate and effective. The New York Central was, as an offsetting step, seeking a cross-cut through northwestern Connecticut to the Boston & Albany line, and was making its survey. The new line could be built under the Connecticut general railroad law. But President Mellen flung himself athwart the path. He appealed in "open-air lobby" to the state legislature for what was practically a repeal of the general railroad act. Were Connecticut and New England to be cut off from cheap coal via the O. & W.? Was the New Haven to be penalized for this beneficent act by the legislature's assent to the New York Central crosscut? The legislature answered with an emphatic "No," and granted the repealer. Two short years have passed and lo! the omens point to return of the philanthropic O. & W. to the New York Central as, presumptively, a makeweight in the Boston & Maine deal. There is another odd historical twist in New England railroad happenings not so incongruous as it is picturesque. It will be recalled how some fourteen years ago President C. P. Clark, of the New Haven, agreed with the Connecticut River Railroad Company's directors for an absorption of their snug and profitable property, reaching up into Boston & Maine territory; and how Boston & Maine interests, acting through Boston bankers, bought up, at a great price, a majority of the scattered Connecticut River shares, blocked the deal and merged the line with the Boston & Maine system. Now, a decade and a half later comes along with giant strides the New Haven again and engorges not only the Connecticut River child, but the Boston & Maine parent. Thus, on the railroad stage, is American comedy—and now and then Greek tragedy—enacted in vivid colorings and contrasts.

A discussion of the trolley situation in Ohio, as regards competition with the steam railroads, was printed in the *Railroad Gazette*, February 6, 1903, and figures of the losses to the steam roads in the vicinity of Cleveland were shown. These have been widely quoted, turning up this spring in Herrick and Boynton's *American Electric Railway Practice*. We are now enabled to bring this table up to the year 1907, as follows:

Lake Shore & Michigan Southern.

Passengers Carried Between Cleveland and Oberlin, and Intermediate Points.

Year.	Westbound.	Eastbound.	Total.	Average per month.
1895.....	104,426	98,588	203,014	16,918
1902.....	46,328	45,433	91,761	7,647
1906.....	58,837	57,294	116,131	9,678

Passengers Carried Between Cleveland and Painesville and Intermediate Points.

1895.....	97,460	101,832	199,292	16,608
1902.....	13,106	15,602	28,708	2,392
1906.....	19,204	21,982	41,186	3,432

New York, Chicago & St. Louis.

Passengers Carried Between Cleveland and Lorain.

Year.	Total passengers.	Revenue.	Average revenue.
1895.....	42,526	$25,523	60.0 cents.
1902.....	9,795	4,379	44.0 "
1906.....	7,422	3,836	54.7 "

Oberlin is 34 miles from Cleveland, Painesville 29, and Lorain 26. The statistics of the trolley roads are not kept in such fashion that exact comparisons can be made of the gains to offset these losses. Seven years after the trolley lines began active business, one of them, covering approximately the territory described in one of the above classifications, was doing thirty times the short-haul business of the steam road between the same points. It is worthy of note that the passenger business on the Lake Shore & Michigan Southern, between the points cited, after languishing to a minimum in 1902, is now increasing again, though the increase is slight. On the other hand, the business between Cleveland and Lorain, on the New York, Chicago & St. Louis, is even smaller than it was five years ago. It is to be regretted that there is no statistical method of showing the increases in general business arising from the building up of suburban traffic by the trolley lines. Nevertheless, it may be risked with assurance that the total effect of this trolley line development has been to increase, rather than decrease, the earnings of the steam roads.

VOLUNTARY PUBLICATION OF ACCIDENT REPORTS.

Mr. Kruttschnitt's decision to publish the true causes of all accidents which may occur on the Union or Southern Pacific lines is warmly to be commended.* There can be no doubt that the only motive actuating either the managing officers or the directors above them is the laudable one given in the announcement—to "reduce the risk of casualties to the extreme minimum." And yet a perusal of this announcement suggests some mild speculations concerning the probable actual results. A "policy of perfect frankness" toward the public will have to contend with a chilling atmosphere. Not that people will refuse to take the railroad's word at its full value; but "the public" is such an elusive entity to deal with. The average reporter and the average editor believe in blaming the company instead of the employees for most accidents, and this bent of their minds will influence everything that they say or do. And, for better or worse, these managers of the news-machine do mould public opinion in this matter. In some newspapers, the railroad's statements will have to be stereotyped by the road itself, to insure a fair presentation, if we may judge by those papers' treatment of accident news in the past.

The announcement expresses the hope that publishing the causes of accidents will help the company to enforce better discipline; which must mean that the superintendents, when acting in private, cannot enforce their orders. This is equivalent to a declaration that the employees are decidedly unruly; and as the first article of the newspapers' creed is friendship to the employee no one need expect that facts unfavorable to an employee are going to be heralded with any excessive gladness. The statement that an engineman is directly responsible for a collision, and therefore should bear, say, 99 per cent. of the responsibility, and that the superintendent who made or approved a faulty rule or failed to detect the faults of a faulty man is chargeable with only 1 per cent., will be received with incredulity. In any event the newspaper critic will advocate the imposition of 99 per cent. of the punishment on the company. That is the attitude of juries also. It takes a strong and determined judge to make jurymen accept any other view; and if they accept it they are likely still to acquit or disagree.

The newspapers, with rare exceptions, aim to please the greatest number of readers, which, in the case of "labor"—the brotherhoods—versus a railroad company means please "labor" every time. The employees' brotherhoods believe that brothers should go free of punishment even when they have caused a collision or a derailment—for the reason, perhaps, that they think the penalties under the criminal laws are too severe.

But publicity in this matter will do good whether it does or does not result in immediately strengthening the arm of justice. The attitude of the press could not easily be changed even if Mr. Kruttschnitt were to have his accident investigations made and published by expert outside unbiased critics; but it seems a pity that this could not be done. Our Government has been inexcusably slow in this matter. Government investigation has not always been char-

*The Union Pacific System and Southern Pacific Company, courting full investigation, have decided to give freely and fully all information at command to throw light upon the causes and responsibilities for railroad accidents. The findings of boards of inquiry will be given to the daily papers, and the policy of the company will be one of perfect frankness with the public as to these matters.

Investigation of accidents by such boards of inquiry have long been an established policy, having been inaugurated on the Pacific System over four years ago, and on the Union Pacific Lines for more than three years. Whenever an accident occurs the cause of which is not apparent beyond question, the Division Board of Inquiry, made up of the division superintendent, the master mechanic and the resident engineer, is convened immediately . . . and submits its findings by wire to the general office with formal reports by mail, the report being signed by all members concurring in the conclusions. All employees involved are independently questioned, their answers being taken down in writing. Examinations are made of rolling stock and track where accidents may have possibly been traceable to such causes, and every effort is made to determine the cause of the accident clearly and unquestionably. The report "causes unknown" will not be accepted until every means of locating the cause has been exhausted.

Where members of the Division board do not agree, or where their report is not satisfactory, a second board of inquiry, made up of the General Superintendent, the Superintendent of Motive Power and the Chief Engineer in charge of Maintenance of Way and Structures, is convened by the General Manager. This higher board proceeds to the scene of the accident and . . . must likewise submit its finding to the General Manager. If the General Manager still has any doubt, he is authorized to employ expert assistance and adopt any other means necessary to determine the cause of the accident. The findings of the Board of Inquiry conducted in this manner are absolutely unbiased, and it is hoped that publicity as to the true cause may help in bringing about better discipline amongst the employees and be a deterrent effect against accidents in the future. A railroad company is interested more than anyone else possibly can be in the reduction of its casualty account and in a case of accident should have nothing to conceal and no one to shield, its only desire being to locate the cause of the trouble or the party responsible with a view of reducing the number of accidents classed as preventable. . . . The officers hope that this policy, taken in connection with the surprise tests of signal observations by train and engine men and the large amount of block signals lately erected, which at the close of the year should provide this protection on nearly 4,700 miles of track—most of this work being done in the past two years—together with earnest and well-directed effort on the part of the officers, will be of material assistance in reducing the risk of casualties to the extreme minimum.

acterized by perfection, even under the excellent system established by the British government, but notwithstanding the limitations of human fallibility a railroad manager finds a government report a much more satisfactory means of answering criticisms of newspapers or individuals than any statement which he can himself make. He cannot possibly write or speak with the true perspective—or at any rate not with a perspective that will satisfy the public. He can be unprejudiced but he can never make people generally believe that he is. Railroads have for years in important accidents admitted the fullest responsibility for the fault by paying immense sums in damages beyond what a strict construction of the law would require of them, and yet public criticism is not allayed.

The thing that would most please the public would be to let people see what is done to cure the accident evil. Levelheaded citizens are not so much interested to know whether it is Engineman Brown or Conductor Jones that is responsible, as to see what is done to prevent conductors and enginemen from committing the same error in the future. In this matter the English system falls short of satisfying the public. The railroad journals publish the Government inspectors' reports with all necessary fulness, but these do not say what discipline has been administered, nor—until perhaps a year or two afterward—does the public know anything as to how fully the companies carry out the recommendations of the inspectors.

In speaking of this feature of the subject we are not criticising Mr. Kruttschnitt in particular for he has done as much, probably, as any manager in America, toward carrying out a true policy of frankness and in making the practices of the subordinate officers such that they will bear publicity. In his plans for block signaling thousands of miles of line within a single year he has evinced a financial and practical boldness never before heard of; and, judging by the testimony of unprejudiced eastern railroad managers who have visited the Union Pacific lines, the discipline of trainmen on those lines is as marked in its excellence as is the policy of the company in easier problems. If any eastern railroad officer desires to take a summer-school course in the Great American Railroad University he cannot afford to neglect the advantages offered by the "field observations" available west of the Missouri river. Indeed, we do not know but this is what Mr. Eustis means when he advertises so loudly in the magazines to "Spend Your Vacation in Colorado."

SALE OF THE CENTRAL OF GEORGIA.

The Central of Georgia operates 1,890 miles of line, about two-thirds of which is in Georgia, one-third in Alabama, and 4½ miles, over which it reaches the city of Chattanooga, in Tennessee. Its most important through lines are from Chattanooga, Tenn.; Atlanta, Ga., and Birmingham, Montgomery, Andalusia and Lockhart, Ala., via Macon, Ga., to Savannah. Several parts of it parallel lines of the Southern Railway. The Central of Georgia has within recent years come to be prosperous. Beginning with the first payment on the third series in 1905, 5 per cent. has since been paid on the first, second and third preference income bonds. The first payment on the second incomes was in 1904, before which the two junior series had never received any return. These securities are the ones in which the public is interested. The exact ownership of the $5,000,000 stock was not generally known up to last week except that it was in some way held in trust in the interests of the Southern Railway, which, because of its parallel and competing lines, was unable to take over control as a matter of public record. However, the late Samuel Spencer and another Southern Railway director were directors of the Central of Georgia. It now appears that this stock has been held by the same committee which in 1894 reorganized the old Richmond & West Point Terminal Railway & Warehouse Company, of which the Southern Railway is the successor company. This committee has maintained its existence in order to hold this Central of Georgia stock which came to it in the course of reorganization of certain roads in Georgia in which the Richmond Terminal Company was interested. It was announced last week that the Richmond Terminal reorganization committee has sold its holdings—almost the entire capital stock of the Central of Georgia—to Oakleigh Thorne, a New York banker, and Marsden J. Perry, of Providence, R. I., who are for the present to operate and develop the road as an independent property. The proceeds of this sale are to be turned over to the Southern, which, though it never actually held control of the Central of Georgia, is entitled to the financial benefit of any sale of the stock held by the Richmond Terminal committee. This sale of the road by the reorganization committee apparently marks the decision on the part of the Southern Railway that it is preferable to give up the advantages of an allied control, in order to set itself right in the eyes of the people of Georgia, who have shown great dissatisfaction with its alleged control of the local road. One of the most valuable parts of the property thus sold is the Ocean Steamship Company, which has lines from Savannah to New York and to Boston. As no report of its operations is made and as it is carried upon the balance sheet of the Central of Georgia at an absurdly small figure, it is not possible to judge accurately as to its value, but it is one of the most successful coastwise lines, and we are inclined to think that it could have paid the whole cost of one or two new steamers out of its aggregate surplus earnings for the last three years. Since the sale was announced it has been suggested that the Central of Georgia will eventually be sold to the Rock Island Company in order to give the St. Louis & San Francisco an outlet to the Atlantic seaboard. The two roads connect at Birmingham, Ala. Should this be done, the Rock Island lines in the West would have the same sort of an advantage in rate-making that the Southern Pacific has as a trans-continental line by reason of its control of steamers from New Orleans to New York. It would then be possible to ship goods from northern Atlantic ports to Savannah by the Ocean Steamship Company and carry them from Savannah to the territory west of the Mississippi river entirely over Rock Island lines, thus giving a through water and rail line between the Southwest and New York and Boston under Rock Island management, which could compete even with the trunk lines if necessary. At the rate the Southwest is now developing, such a new through line from the north Atlantic ports should at once find plenty of traffic in addition to its potential advantages to the Rock Island Company as a rate-maker.

In India, it appears, there is no traffic department as we understand the term, the department which holds that title being almost entirely concerned in moving rather than getting the traffic. The *Indian Railway Gazette* in an editorial urges the establishment of a real traffic department with freight and passenger solicitors, after the fashion of English and American practice. At first sight this would appear to be unnecessary as for the most part there is no competition between different lines in India. Each road has its own sphere of influence and tariffs cannot be reduced below a fixed minimum. It is believed, however, that by the establishment of a separate department concerned only with securing traffic, it would be possible to extend and widen the business of any particular road by branching out in new directions and creating new industries and a desire to travel where they do not now exist. In regard to the passenger traffic, first, second and intermediate class traffic is unprofitable in India, while it is the third class traffic, made up of natives, which pays. This makes up nine-tenths of the passenger business, yet the time-tables are printed in English and are, therefore, useless to most of these travelers. Time cards and guide books might be printed in the vernaculars and distributed among the towns and villages along a line, and attractive posters setting forth the sanctity and virtue of some particular (non-competitive) shrine, posted in conspicuous places. As a unique example of progressiveness in the attraction of travel the case of a certain railroad is cited which presented to a native shrine of some sanctity a valuable jewel, in order to increase pilgrimages over its line to that point. Although it is evident from this instance that English or American traffic methods would have to be adapted to Indian conditions, yet the history of the traffic department, particularly in this country, amply proves that such an officer would be likely to succeed on an Indian railroad. The great skill of the traffic department has been its ability to adapt itself to conditions and originate means for securing traffic, and this same ability could be applied, we have no doubt, with equal success in India.

NEW PUBLICATIONS.

Proceedings of the Society for the Promotion of Engineering Education. Vol. XIV. 300 pages; 5¾x8½ in.; cloth. Edited by Dugald C. Jackson, Charles L. Crandall and Wm. T. Magruder, Committee. The Engineering News Publishing Co., New York. 1907.

The volume at hand contains the roll call of the society, a report of the fourteenth annual meeting, and a collection of some 19 papers presented at the meeting. These give a pretty wide outlook of the problems arising in the education of young engineers, and are well worth reading by those interested in the subject.

Specifications for Street Roadway Pavements. By S. Whinery. New York: The Engineering News Publishing Co., 1907. Pamphlet; paper cover; 6 in. x 9 in. Price, 50 cents.

The municipal engineer is often called on to frame specifications for street pavements and if he is not, by reason of wide experience, familiar with the many peculiar conditions of this class of work,

he may find difficulty in adopting a specification from other sources which will properly safeguard the municipal interests and be fair to the contractor. In such cases a broad general specification is of value as a guide, and such a specification based on the best current practice in street paving is contained in this pamphlet. Mr. Whinery, recognizing the wide difference of opinion among engineers as to many details of practice and standards, has not laid down the conditions covering these points in a dogmatic spirit. Throughout the pages there are numerous explanatory footnotes giving the author's reasons for the wording used or outlining alternative methods which might be employed.

The general spirit of the specifications is to lay down the methods and standards of material to be used leaving the engineer to assume the responsibility for the results. This requires rigid enforcement of the provisions of the contract, but in the author's opinion is better than a specification framed to secure only the required results without regard to the methods or materials employed, or on the other hand, a specification which attempts to lay down the methods and place the responsibility of the results on the contractor.

The specifications here given include the introductory general clauses, foundations of concrete, paving stone and broken stone, bituminous or asphalt pavements both sheet and block, granite, brick and wood block pavements, and a broad general specification for new and untried pavements laid under service guarantee only.

CONTRIBUTIONS

Rolling Rails in a Universal Mill.

Chicago, June 26, 1907.

To the Editor of the Railroad Gazette:

In your issue of June 7 you published a new section for 100-lb. rails designed by Capt. R. W. Hunt, which has been adopted by a large railroad system. Capt. Hunt says that this section is designed to overcome the imperfections due to the difficulty in making the metal fill out the thin flanges, which necessitates rolling the steel at a much higher temperature than would be necessary if the flanges were made thicker, as he proposes. This may be true, but the proposed section will not cure the difficulty.

The trouble with the wide rail flange is in the delivery from the rolls, the angle made by the face of the flange with the axis of the rolls being such that true rolling action is impossible; so that, with the exception of perhaps one or two passes, the metal in the flange gets very little work other than the churning of the lower roll on the face of the flange. Moreover, if the defects in the flange are due to the high finishing temperature, why does not the head develop still greater defects, since the finishing temperature of the head is much higher than that of the flange?

The weakest part of the American rail has always been in the flange, in spite of the fact that the sections are unbalanced; that is, the center of gravity of the section is nearest the flange. In a paper read before the Western Society of Engineers, May 29, 1907, the writer called attention to the defect in the standard rail sections in this regard; but the proposed section is even a greater offender in this respect.

In any beam subject to bending, the distance of the outer fibers from the neutral axis should be the same, both above and below the neutral axis, in order to have no part of the section on one side subjected to a higher stress than on the other side. In other words, the center of gravity of the section should be in the center of the figure. This is fundamental. The proposed section departs so far from this principle that the metal in the head will be subjected to a stress 24 per cent. higher than in the flange, so that, although the rail has been made deeper, its efficiency as a beam has been actually reduced. To be sure, this will relieve the metal in the flange from some of its duty, but it will be at the expense of the metal in the head.

If the metal in the flange is inferior to the metal in the head, then there is only one remedy, and that is to give the metal in the flange more work. This points to the utilization of a universal mill of the Grey type, such as is in operation in Differdingen, Germany, for rolling broad-flange beams. Such a mill is now being built by the Bethlehem Steel Company for rolling beams in this country. The Bethlehem Steel Company considered the rolling of rails in such a mill, but they felt that the development of the Grey mill for producing structural shapes was a sufficient burden to undertake, for the present at least. Thus the idea of rolling rails in a universal mill is not new, and has been proposed by Mr. Henry Grey, the inventor of the Grey mill.

In considering the rolling of rails in a universal mill, the question will arise as to the possible tonnage capacity of such a mill as compared with the present three-high mill. This can be answered by making the horizontal rolls, and perhaps the vertical rolls as well, three-high in the proposed universal mill, so that the metal in the rail, in all of its parts, would receive exactly the same amount of work. A three-high universal mill for rolling thin skelp is now in operation at the National Tube Works, McKeesport, Pa.

J. W. SCHAUB,
M. Am. Soc. C. E.

The Italian Railroads.

Rome, Italy, May 22, 1907.

To the Editor of the Railroad Gazette:

In your generally so well informed paper I am sorry to notice a paragraph about the present state of Italian railroads, which, I am glad to say, is absolutely unfounded. The incident about the King of Italy having to abandon a trip because he could not find a spare engineman is too amusing, and you yourself express doubt about its truth. I am glad to say it was not true.

The Mayors of Genoa, Milan and Turin met, but they met for the purpose of spurring the government to build a new, more direct line between these cities; and the project has been given careful consideration. The proposal to buy more rolling stock was made in November, 1905—rather a long time ago—and a very large proportion of the new material has already come into service, and the rest will be completed and put in use before autumn.

The wages of the *personnel* have all been increased from 10 to 20 per cent., and a very good feeling now has been cemented between our employees, the administration in general, and its able Director-General, Commendatore Riccardo Bianchi, who is absolutely idolized by his friends, and even respectfully admired by his political opponents.

On the whole, I am glad to say, Italian railroads are now on an excellent basis, and the service has become quite normal and satisfactory, notwithstanding the enormous increase in the traffic—fully 22 per cent.—in comparison with 1905, and the inevitable difficulties arising from the welding together of four different railroad systems, with more than 120,000 employees, with different regulations and habits, and accustomed even to different signals. For several months no complaints have been made against the service, which is settling down to a normal and active pace.

LUIGI LUIGGI,
Administration Councillor, State Railroads.

The Highest Railroad Station.

Newark, Del., June 3, 1907.

To the Editor of the Railroad Gazette:

There are a number of railroad stations in Peru that are higher than the one at Corona, Colo. Vincocaya, on the Arequipa & Puno R. R., is 14,360 ft. On the Central Railroad of Peru there are several.

Chicla	12,215 ft.
Casapalca	13,606 "
Yauli	13,420 "
Oroya	12,178 "
Cerro de Pasco at the end of branch from Oroya is	13,974 "
Oroya is the lowest point on that road.	
The lowest point on the Central system is on the dock in Callao; it is	8.7 "
The highest is in the Galera Tunnel	15,666 "

All of these are standard gage railroads.

JAS. R. MAXWELL.

Sixty-six Miles an Hour for Twenty-four Hours.

New York to Chicago in 13 hours, 45 minutes, would mean a speed unheard of for that distance, namely, 66 miles an hour; but that is the rate which was made with an automobile in England last week on a three-mile racing track in a 24 hours' continuous run, the total distance traveled being 1,581¾ miles. This run of a day made by the same man, equals the distance from New York by the New York Central, the Rock Island (via Englewood) and the Union Pacific to Thummel, Neb., 126 miles beyond Omaha, and nearly to Central City; or from Jersey City by the Pennsylvania and the Burlington to within eight miles of Holdrege, Neb. The following details are from the *New York Times*:

In the 24 hours ended at 6 o'clock Saturday evening, June 29, S. F. Edge, in his six-cylinder Napier motor car, traveled 1,581 miles and 1,310 yards over the Brooklands racing track at Weybridge, and nothing approaching that speed had ever been maintained for 24 hours by motor car, railroad train or any other locomotive apparatus. Mr. Edge undertook to cover 1,440 miles in 1,440 minutes, and bettered it by 141 miles 1,310 yards. Never once did Edge's speed fall under 60 miles an hour. Many times the daring rider had to stop on account of punctured tires to have a wheel replaced with lightninglike quickness by expert mechanics. Two cars accompanied him, driven by relays of drivers. The cars swayed on their springs like hammocks, now and again bumping over obstacles with a jerk that would have sent an unwary rider headlong. The feeding of Edge was entrusted to the mechanician who accompanied him. He gave tabloids and coffee nibs. Edge thinks with a racing car he could make 85 miles an hour for 24 hours.

In the ninth hour the distance traversed was almost 72 miles;

in the fourteenth hour 78 miles and 450 ft. The Brooklands track is at Weybridge. It is pear shaped; the two long sides being each one mile long. It was built specially for automobile speeding and is 100 ft. wide. In the curved portions the outer half is banked, the outer edges being perpendicular. The roadway is of concrete. It is impossible to walk up the banking higher than 15 ft. from the top. Around the course are sentry boxes equipped with telephones. A special staff, an ambulance car, and a breakdown gang are always in attendance. For spectators there are three inclosures, with a total seating capacity of 30,000 and a holding capacity of 500,000. The track is practically an inverted coliseum, for while in the Roman amphitheater the spectators surrounded the arena, at Weybridge the arena surrounds the spectators. The entrance to the inclosures is by means of three tunnels under the track.

Changes in the Rules of Interchange.

The Arbitration Committee of the Master Car Builders' Association this year recommended a number of changes in the Rules of Interchange which were adopted as a whole by the Association. We give below the principal revisions referring to the numbers of the rules in force during the past year.

Rule 2.—The following paragraph is added: "In case cars are rejected by the receiving road and returned to the delivering company all the defects objected to must be designated on a return card of the following form, placed on the car adjacent to the destination card:

RETURN CARD.

..... Car No. .....

from ..... Ry.,

to ..... Ry.,

for the following defects: .....

.....

.....

.....

.....

.....

.....

Inspector.

Rule 21.—Omit "For wheels cast after Aug. 31, 1904," on the drawing accompanying the rule.

Rule 22.—Changed to read: "Axles broken or having seamy or pitted journals, fillets in back shoulder worn out, or collars broken off or worn to ¼ in. or less under fair usage."

Rule 29.—Changed to read: "Torn air hose, defective, missing or worn-out parts of brakes, not elsewhere provided for, which have failed under fair usage, except missing material on cars offered in interchange. Owners responsible."

Rule 32.—Changed to read: "Missing air-brake hose or missing or broken air-brake fittings, etc. Delivering company responsible."

Rule 34.—Omit the words "or air-brake pipes, but no air-brakes."

Rule 36.—Omit that part of the rule referring to date.

Rule 46.—Heading covering combination of defects changed to read: "Combination of defects which denotes unfair usage if occurring at the same end of the car."

Rule 48.—Changed to read: "Damage to coupler, accompanied by damage to either combined front and back coupler stop, filling block draft timber or its substitute, or end sill."

Rule 50.—Changed to read: "Damaged combined front and back coupler stop or filling block, accompanied by damage to either coupler or end sill."

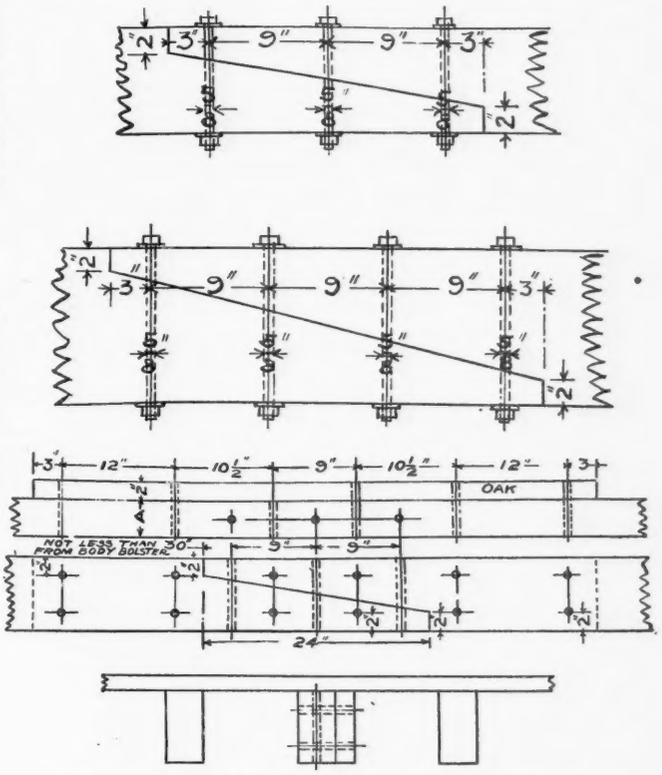
Rule 53.—Changed to read: "Damaged end sill, accompanied by damage to either coupler, coupler pocket, combined front and back coupler stop, filling block, draft timber or its substitute, or longitudinal sill."

Rule 56.—Footnote regarding American continuous draft key changed to include also the draft rod.

Rule 65.—Changed to read: "The splice may be located either side of body bolster, but the nearest point of any splice must not be within 12 in. of same, excepting center sills, which must be spliced between body bolster and cross-tie timbers and not within 30 in. of either. The splicing of two adjacent sills, *except center sills*, at the same end of car or the splicing of any sill between cross-tie timbers, will not be allowed.

"Steel sills may be spliced as shown in Figs, A, B and C, at any point, and one or more sills may be spliced at same end of car."

The form of splicing wooden sills shown herewith is approved.



Rule 72.—Changed by the addition after the word "car" in the third line the words "or if the light weight is obliterated."

Rule 89.—Schedule of prices for wheels and axles revised as follows:

	New.	Second-hand.	Scrap.
One 36-in. cast-iron wheel	$10.50	$7.75	$5.25
One 33-in. cast-iron wheel	9.00	7.00	4.75
One 33-in. steel or steel-tired wheel	23.00	17.25	5.00
One axle, 100,000 lbs.	21.50	11.75	7.75
One axle, 80,000 lbs.	17.75	10.00	6.50
One axle, 60,000 lbs.	14.00	7.75	5.25
One axle, 50,000 lbs. (or under)	11.50	6.25	4.25

Also omit sentence reading: "All steel or steel-tired wheels of the different makes to be charged at current market prices, less freight charges."

Rule 94.—The prices charged under this rule have been revised to bring them more nearly on a level with current market prices. Prices have been inserted for the different parts of the 10-in. air-brake equipment as well as the 8-in. The following are the principal changes:

	Charge.	Credit.
Castings, rough iron, per pound	$0.02	0.00^{5}/_{10}$
Castings, rough, malleable, per pound	.03½	.00½
Coupling, dummy	Eliminate.	
Coupler, M. C. B., complete, new, malleable iron 5x5 shank	Eliminate.	
" M. C. B., complete, new, steel, 5x5 shank	8.75	.....
" M. C. B., complete, new malleable iron, 5x7 shank	Eliminate.	
" M. C. B., complete, new, steel, 5x7 shank	9.50	.....
" body, one, new, malleable iron, 5x5 shank	Eliminate.	.90
" body, one, new, steel, 5x5 shank	6.50	1.05
" body, one, new, malleable iron, 5x7 shank	Eliminate.	1.00
" body, one, new, steel, 5x5 shank	7.75	1.15
" knuckle, one, new, open, omit charge, credit remain	.....	.40
" Knuckle, one, new solid	2.00	.45
Other individual malleable, wrought or steel parts	.04	.....
Door for end of box or stock car, wooden, each, applied, no credit for scrap	1.95	.....
" for end of box or stock car, ventilated (wooden frame with iron rods), each, applied, no credit for scrap	3.30	.....
" for side of box or stock car, wooden, each, applied, no credit for scrap	3.65	.....
" for side of box, or stock car, ventilated (wooden frame with iron rods), each, applied, no credit for scrap.	5.50	.....
" (new item) for side of carriage, automobile or furniture car, wooden, each, applied, no credit for scrap	5.00	.....
" for side of stock car, with iron rods, each, applied, no credit for scrap	4.40	.....
" for roof of coke car, wooden, each, applied, no credit for scrap.	2.45	.....
" for roof of stock car, wooden, each, applied, no credit for scrap.	.85	.....
Half-door, for side of box or stock car, each, applied, no credit for scrap.	2.50	.....
Journal bearings, brass or bronze, lined or unlined, per pound, applied.	.20	.15
Journal bearings, filled, brass or bronze, shell, per pound, applied.	.15	.11

(The weight charged for new journal bearings

for 7-in. journals and over, but not 8 in. long, shall be 10 lbs.; for scrap bearings, 6 lbs. The weight charged for new journal bearings for journals 8 in. long and less than 9 in. long shall be 13 lbs.; for scrap bearings, 8 lbs. For new journal bearings for journals 9 in. long or over, but not 10 in., 20 lbs.; for scrap bearings, 12 lbs. For new journal bearings for 100,000-lb. capacity cars (5½x10 in.) the weight shall be 25 lbs.; for scrap bearings, 15 lbs.		
Labor per hour	.25	.....
Lumber, as specified, per ft.	.03½	.....
Steel for springs, rough, per lb.	.05	.00¾
Steel, pressed and sheet, per lb.	.03½	.00½

Rule 97.—Change word "channels" to "structural steel."

Rule 105.—Increase charge for altering height of one end of one car from $1 to $1.10 net.

Rule 106.—Changed as follows: Cut out item reading, "coupler stops, all, at one end of car, replaced, 3 hours," and change the next two items to read as follows:

Coupler, with stem attachments, coupler springs, one or more follower plates, American continuous draft key, American continuous draft rods, one or *more* coupler stops, renewing or replacing, any or all, at same end of car, at same time	3 hrs.
Coupler, with pocket attachments, coupler spring, one or more follower plates, one or *more* coupler stops, coupler pocket, coupler pocket rivets, renewing or replacing any or all, at some end of car, at same time	4 "
Siding, removed and replaced, per lin. ft.	15 cts.
Siding, removed and replaced, where nails are set and holes puttied	20 cts.
Each side or intermediate sill spliced, when *longitudinal* sills have to be replaced, as above	6 hrs.
When necessary to remove load to replace body center plate, bolt or bolts, one or two draft timbers or draft timber bolts, at one end of car	3 hrs.
Removing temporary advertisements tacked on car, per car	50 cts.
Removing temporary advertisements, pasted, glued or varnished on cars, per car	$1.00

Under the head of "Repairs of Steel Cars," increase the rate per hour for straightening or repairing parts from 20 cents to 25 cents.

Rule 112.—All the items for air-brake repairs are increased slightly and an additional sentence added to the rule as follows: "No labor to be charged for adjusting brakes."

Rule 113.—Prices for car bodies advanced as follows: The settlement prices of new eight-wheel cars shall be as follows, with an addition of $27.50 for each car equipped with an 8-in. air-brake equipment and $35 for 10-in. air-brake equipment. The road destroying a car with air-brakes may elect to return the air-brake apparatus, including such attachments as are usually furnished by the air-brake manufacturer, complete and in good condition:

BODIES.

Wood.

Box car, 8-wheel, 40 ft. long or over	$440.00
" " 36 ft. long or over, but under 40 ft.	385.00
" " 34 ft. long or over, but under 36 ft. long	360.00
" " 32 ft. long or over, but under 34 ft. long	330.00
" " under 32 ft. long	265.00
" ventilated, 8-wheel, 40 ft. long or over	470.00
" ventilated, 8-wheel, 36 ft. long, but under 40 ft.	415.00
" ventilated, 8-wheel, 34 ft. long, but under 36 ft.	385.00
Flat car, 8-wheel, plain, 40 ft. long or over	200.00
" 8-wheel, plain, 32 ft. long or over, but under 40 ft.	155.00
" " plain, under 32 ft. long	110.00
Gondola car, 8-wheel, drop-bottom, 40 tons capacity or over	330.00
" 8-wheel, drop-bottom, 30 tons capacity or over but under 40 tons	300.00
" 8-wheel, drop-bottom, 25 tons capacity or over, but under 30 tons	275.00
" 8-wheel, drop-bottom, 20 tons capacity or under	200.00
" " hopper-bottom, 50 tons capacity	440.00
" " hopper-bottom, 40 tons capacity or over, but under 50 tons	360.00
" 8-wheel, hopper-bottom, 30 tons capacity or over, but under 40 tons	330.00
" 8-wheel, hopper-bottom, 25 tons capacity or over, but under 30 tons	290.00
" 8-wheel, hopper-bottom, 20 tons capacity or less	220.00
" " plain, 50 tons capacity and over	350.00
" " " 40 tons capacity, but under 50 tons	300.00
" " " 30 tons capacity, but under 40 tons	275.00
" " " 25 tons capacity, but under 30 tons	250.00
" " " under 25 tons	140.00
Stock car, 8-wheel, 34 ft. long or over	330.00
" " 32 ft. long or over, but under 34 ft.	300.00
" " under 32 ft. long	265.00

The lengths of cars above mentioned, refer to the lengths over the end sills.

In the case of double-deck stock cars, $25.00 may be added to the prices given above for stock cars.

Where the capacity of the car is 60,000 lbs. or over, 10 per cent. should be added to the above prices for the car bodies.

When cars of 60,000 lbs. capacity or over, and so stenciled, have trucks with journals 4 in. or over in diameter when new, $40 per car shall be added to the figure as given above for the values of car bodies, when equipped with metal bolsters.

When cars are equipped with metal center sills, $40 shall be added to the values of bodies for cost of such metal sills.

Steel.

Box car, wooden body, metal underframe, 8-wheel, 50 tons capacity, 38 ft. 6 in., or over, over end sills	$825.00
" wooden body, metal underframe, 8-wheel, less than 50 tons capacity, 36 ft. or over	740.00
Flat car, wooden floor, metal underframe, 8-wheel, 50 tons capacity, 40 ft. over end sills	770.00
Flat car, wooden floor, metal underframe, 8-wheel, 40 tons capacity, 40 ft. over end sills	590.00
Gondola car, all metal, 8-wheel, hopper-bottom, 50 tons capacity, 33 ft. over end sills	825.00
Gondola car, all metal, 8-wheel, drop-bottom, 50 tons capacity, 40 ft. over end sills	815.00
Gondola car, all metal, 8-wheel, plain, 50 tons capacity, 40 ft. over end sills	790.00
Gondola cars, wooden body, metal underframe, 8-wheel, flat bottom, 40 ft. over end sills	790.00
Gondola car, wooden body, metal underframe, 8-wheel hopper bottom, 32 ft. over end sills, but under 40 ft.	650.00
Flat car, wooden floor, metal underframe, 8-wheel, 40 tons or over, but under 50 tons, 34 ft. long end sills, but under 40 ft.	510.00
Stock car, 8-wheel, wooden body, metal underframe, less than 50 tons capacity, 36 ft. long or over	715.00

TRUCKS.

50,000 lbs. capacity, with metal transoms and wooden bolster, pr pair	$215.00
60,000 " " or under, with wooden bolster, per pair	215.00
60,000 " " or under, all metal, per pair	315.00
80,000 " " or under, but over 60,000 lbs., all metal, pr pair	400.00
100,000 " " or under, but over 80,000 lbs., all metal, pr pair	425.00

Prices include brake-beams complete, truck levers, dead-lever guides and bottom connection rods.

For trucks with steel or steel-tired wheels an additional allowance of $112 per car shall be made.

All trucks in service of 60,000 lbs. capacity or over, which consist entirely of metal, with the exception of the spring plank, shall be known hereafter as all-metal trucks.

Rule 114.—Changed to read: "In the case of wooden cars, the depreciation due to age shall be estimated at 6 per cent. per annum upon the yearly depreciated value of the bodies and trucks only. In the case of all-steel cars and cars with steel underframes, the depreciation shall be 5 per cent. per annum for the bodies of all-steel cars; for bodies of cars with steel underframes the depreciation shall be at the rate of 5½ per cent. per annum, with the exception of flat cars with wooden floors, which shall be 5 per cent. per annum. The depreciation on the value of trucks of steel cars shall be 5 per cent. per annum. Allowances for depreciation shall in no case exceed 60 per cent. of the value new. The amounts $27.50 and $35 for air-brakes shall not be subject to any depreciation."

Rule 115.—Paragraph added reading: "In the case of cars equipped with racks for carrying coke and other purposes, and also stock cars fitted with feeding and watering attachments, the actual cost of these equipments shall be added to the standard settlement price for such cars."

Rule 129.—Changed to read: "Companies shall promptly furnish to each other, upon requisition, and forward free over their own road, material for repairs of their cars injured upon foreign lines, excepting that the company having car in its possession at the time shall provide from its own stock the following:

"Lumber, forgings, hardware stock, paint, hairfelt, piping, air-brake material and all M. C. B. standard material.

"Requisitions for such material shall specify that same is for repairs of cars, giving car number and initial of such car, together with pattern number or other data to enable correct filling of requisition."

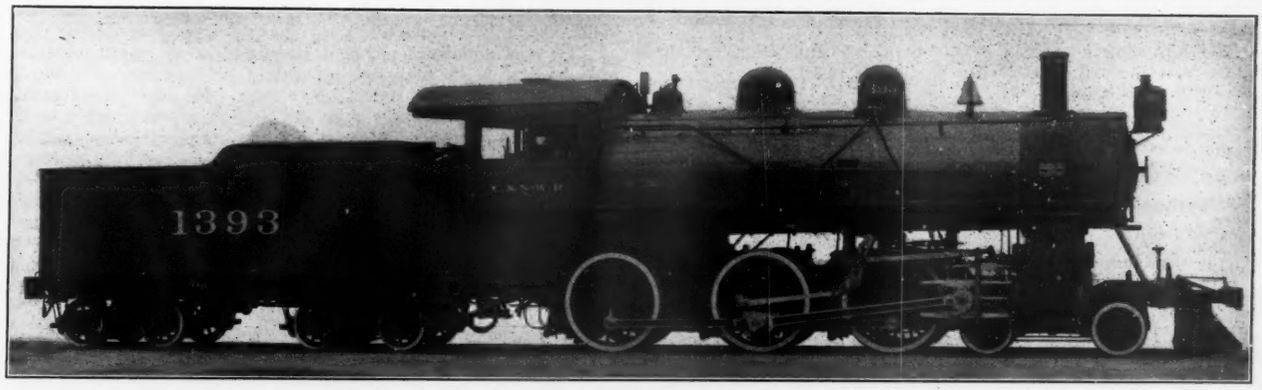
Ten-Wheel Locomotive for the Chicago & North-Western.

The Schenectady Works of the American Locomotive Company have recently delivered an order of 30 ten-wheel locomotives to the Chicago & North-Western Railroad, five of which are equipped with the Walschaert valve gear. These engines are for all-round freight service, and except for the valve gear are of the same specification as the class R-1 engines of that road, which have for several years been their standard engine for this class of service. To the best of our knowledge, however, these are the first engines on the Chicago & North-Western to be equipped with the Walschaert valve gear, which is another proof of the increasing opinion among railroads in favor of this type of gear.

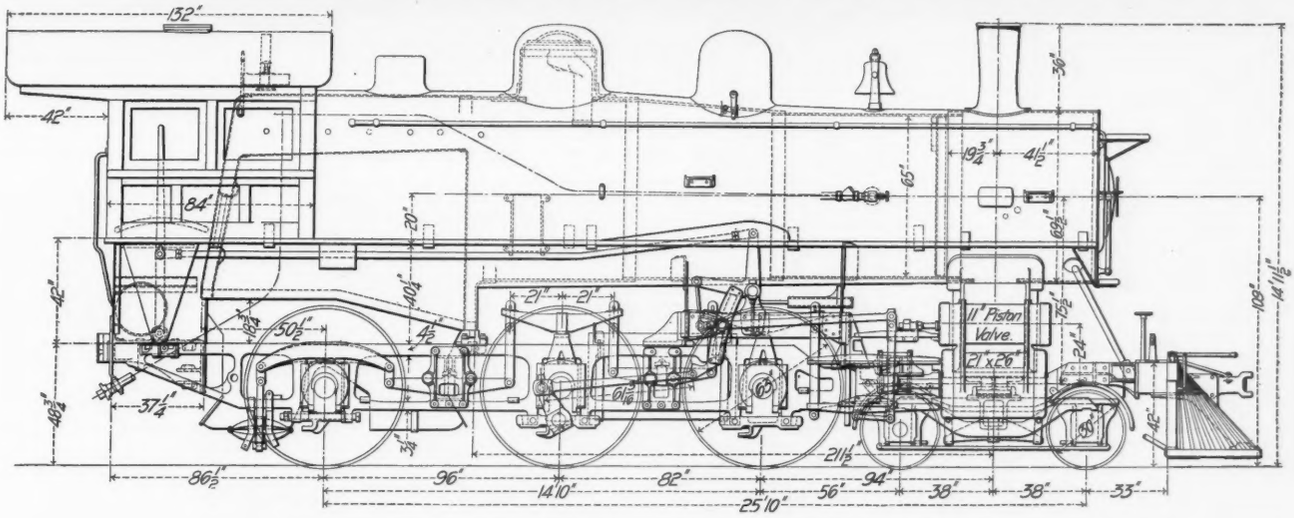
The illustration shows clearly the application, which differs from any arrangement used on previous locomotives built by this company.

The link is supported in a steel casting bolted to the end of the cross-tie or yoke located between the front and middle pair of driving-wheels and extending beyond the driving-wheels. Connecting this cross-tie and the guide yoke and outside of the driving-wheels is a steel plate 1¼ in. thick and 10 in. deep. The reverse shaft bearing is bolted to the top of this plate just back of the center of the forward driving-wheels, and the backward extending arm of the reverse shaft is connected to the radius bar by means of a lifting link.

Another interesting feature in this design is the use of corrugated firebox side sheets. As will be seen from the boiler card, the side sheets are provided with a series of vertical corrugations throughout the length of the sheet to within the last three rows of staybolts at the front and back end, making a waved sheet. The staybolts are located at the top of the waves or in that portion of the sheet which is furthest from the fire. It is a well-known fact that the expansion and contraction that takes place in a firebox shell, due to changes of temperature, causes cracking of the sheets, and it is claimed for this arrangement that the corrugations afford sufficient elasticity to overcome those strains which finally result in the rupture of the sheet. Moreover, in the ordinary flat plate the heads of the staybolts project beyond the face of the plate so that they are more highly heated than the plate and unequal expansion takes place between the head of the bolt and the plate, causing leaks around the head of the bolt. With this arrangement the head of the bolt is somewhat protected from the fire so that the plate and the head of the bolt are more uniformly heated. In addition to these vertical corrugations in the side sheet there is a large and bulging corrugation 2 in. deep, turned on a radius



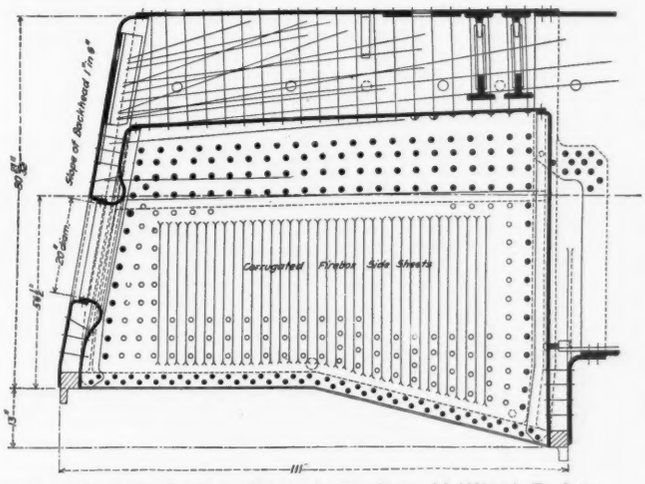
Ten-Wheel Freight Locomotive for the Chicago & North-Western; Built by the American Locomotive Co.



Side Elevation, Ten-Wheel Freight Locomotive; Chicago & North-Western.

of 2¾ in. in the back head surrounding the fire door. This is a rather unusual form and is one that ought to relieve the flanging at that point of much of the stress due to poor circulation and varying temperatures that are apt to result in the cracking which is so difficult and expensive to remedy.

As for the corrugations in the side sheets, this is a survival of an old practice that has been made successful on this road in some way, probably through persistence in its use on the ground of its theoretical correctness. A number of years ago the use of corrugated side sheets was quite common on some roads, but owing to lack of skill in forming the plates or the lower grade of the steel, or a combination of the two, it was not found that any advantage was gained and this form of sheet was abandoned. That it should possess the advantages claimed for it there is no doubt, provided sufficient care is taken in the forming so that undue internal stresses are not set up.



Longitudinal Section Through Firebox, 10-Wheel Freight Locomotive; Chicago & North-Western.

In view of another locomotive recently built by the same company at another works of about the same tractive power as this one, it may be interesting to make some comparisons of the boiler capacities. Referring to the Pacific (4-6-2) passenger locomotives for the Atlanta & West Point Railroad having 22-in. by 28-in. cylinders and with the same boiler pressure of 200 lbs., we find that there is but 1,100 lbs. difference in tractive power to be exerted on six driving wheels in each case, and that they carry but 4,000 lbs. difference in load. Instead, however, of the 1,100 lbs. extra tractive power belonging to the engine with the heavier load, it belongs to the one with the lighter one. In the working of the engines it will probably be found that the Pacific passenger locomotive with the higher calculated tractive power and lower weight is exerting, for the greater portion of its run, a much lower pull than the freight engine, which therefore really needs the increased weight in its practical working. But the greatest difference is to be found in the boilers. They have diameters of 72½ in. and 66⅜ in. respectively. The Pacific engine has 278 tubes 2¼ in. in diameter and 20 ft. long, with 3,261 sq. ft. of heating surface. This 10-wheeler of the North-Western, although the boiler is the smaller, has 334 tubes of 2 in. diameter, 16 ft. long, and with but 2,808.4 sq. ft. of heating surface. This, as far as heating surface is concerned, is what would be expected from the dimensions; but, when this tube heating surface is equated to an equivalent firebox heating surface by the Vaughan formula, we find that that of the Pacific engine equals 729.8 sq. ft. while that of the 10-wheeler is equal to 703 sq. ft. Here is a difference of but 26.8 sq. ft. of what may be called effective heating surface, while the actual difference is 453 sq. ft. Of course, a large portion of this apparent discrepancy is due to the difference in number and size of the tubes in the two boilers. But still it does exist and it is an interesting question, the solution of which would be of great economic value, to decide upon the best diameter and length of tubes to be used in a locomotive boiler. Certainly it is not a matter that can be decided off-hand on any academic considerations or even from any practical data that is now available. This is considering the matter purely from the standpoint of cost, as represented by that of installation, maintenance and operation and disregarding the question of construction which sometimes regulates the length of tubes, so as to meet a desired arrangement of wheels and weights.

The boiler illustrated in connection with this Chicago & North-

Western locomotive is one that has been in use upon that road for several years with very satisfactory results.

The following are some of the principal dimensions of these engines with the ratios between a portion of them:

Cylinder, diameter	21 in.
Piston stroke	26 "
Wheel base, driving	14 ft. 10 "
" " total engine	25 " 10 "
" " total engine and tender	57 " 9 "
Weight on drivers	134,000 lbs.
" of engine	176,000 "
" of engine and tender	315,500 "
Heating surface, firebox	150.79 sq. ft.
" " tubes	2,808.4 "
" " total	2,959.19 "
Grate area	46.27 "
Journals, main driving	9 in. x 12½ in.
" coupled, driving	8½ " x 12½ "
" tender	5½ " x 10 "
Boiler, diameter	66⅜ "
Firebox, length	102½ "
" width	65¼ "
" thickness crown, side and back sheets	⅜ in.
" thickness tube sheet	½ in.
" water spaces	4 in.
Steam pressure	200 lbs.
Tubes, number	337
" diameter	2 in.
" length	16 "
Nozzles, single, diameter	5 in., 5¼ in., and 5½ in.
Stack, diameter	14 in. and 16½ "
Stock, above rail	14 ft. 11¾ "
Wheels, diameter, driving	63 "
Wheels, diameter, truck	30 "
Valves, type	Piston
" travel	5¾ in.
" lap	1 "
" lead	1/16 in.
Tank capacity, water	7,500 gals.
Tank capacity, coal	10 tons
Tractive effort	30,900 lbs.

$$\frac{\text{Weight on drivers}}{\text{Total weight}} = 0.76$$

$$\frac{\text{Weight on drivers}}{\text{Tractive effort}} = 4.37$$

$$\frac{\text{Total weight}}{\text{Tractive effort}} = 5.7$$

$$\frac{\text{Tractive effort} \times \text{diameter of drivers}}{\text{Heating surface}} = 660$$

$$\frac{\text{Heating surface}}{\text{Grate area}} = 64$$

$$\frac{\text{Firebox heating surface}}{\text{Total heating surface}} = 5.09$$

$$\frac{\text{Firebox heating surface}}{\text{Tube heating surface}} = 5.37$$

$$\frac{\text{Weight on drivers}}{\text{Total heating surface}} = 46$$

$$\frac{\text{Total weight}}{\text{Total heating surface}} = 59.48$$

Volume of cylinders ..... 10.4 cu. ft.

$$\frac{\text{Heating surface}}{\text{Volume of cylinders}} = 284$$

$$\frac{\text{Grate area}}{\text{Volume of cylinders}} = 4.45$$

Tube heating surface equated for firebox heating surface (Vaughan formula)	703.0 sq. ft.
Total equated firebox heating surface	853.79 "

Examination of Telegraphers for Railroad Work.*

Upon arrival of the applicant at headquarters, he is taken in charge by the chief operator and examined as to his ability as a telegrapher. Due allowance is made for natural nervousness of the candidate under examination and every opportunity is afforded him to show what he can do. To meet the standard he has to copy three train orders in succession of different phraseology. They must be of legible penmanship and correct without a scratch or fumble, interlineation or alteration, at a rate of speed from 23 to 30 words per minute, averaging five letters per word, and he must correctly transmit and repeat back the same at same average speed. Otherwise he is rejected. Sometimes several applicants in a day are rejected. After passing examination in telegraphy, his letters of recommendation or service cards from previous employers are called for and a copy of same made. They must show a clear record for the previous five years. His credentials are returned to him. If he has no credentials, he is required to wait until his previous employers are communicated with by wire and his record established. Letters of recommendation are verified by mail or wire to insure their being genuine.

The applicant is required to fill out three application blanks, one for the superintendent of telegraph and signals, one for the general superintendent and one for the claim agent. These blanks have a printed form on reverse side for the chief operator's report of examination, that is, proficiency in telegraphy and standing on sight, hearing and colors.

To pass a normal physical examination, an applicant must be able to read with each eye separately printed letters ½ in. long, composed of lines an eighth of an inch wide on a chart at a distance of 24 ft. He must hear the tick of a watch with each ear separately a distance of 36 in. Where the ratchet acoumeter is used the examinee must call off the clicks numerically as they are produced by the examiner, first slowly, then rapidly, first in regular time singly, then by twos and threes with a pause between each two groups of clicks at the required distance. He must group in each class to which they belong five different shades of the following colors (using the Thomson yarns): red, green, blue, yellow, pink, brown and white. The Williams lantern is also used in making an examination on colors. The examinee, at a distance of 20 ft., must call off the names of the different colors as they are given by flash light in rapid succession at the option of the examiner. The lenses vary in diameter, the largest representing switch lights at a distance of 150 ft., the next 600 ft. and the smallest 1,300 ft.

It is found that 10 per cent. of the applicants are disqualified by reason of defective eyesight, 3 per cent. by defective hearing, and 6 per cent. by defective color perception.

If the applicant's record is found to be acceptable, a book of rules is given him to study, and afterwards a pamphlet entitled "Operators' Examination," in which he must answer upwards of 200 questions in writing bearing on the duties of a telegrapher. These answers are checked over and the writer advised of any that are wrong, which he must correct. This is termed his second examination.

After this is done, he is subjected to a third examination which is oral, lasting from four to six hours, on rules considered essential to safety of passengers and trains.

All station helpers and apprentice telegraphers from points along the system who have not previously been present on a similar occasion are brought to headquarters to listen to this oral examination. They hear the important rules explained, the questions, the answers, the comments, the important troubles which telegraphers have had on the road and throughout the country during the last 15 years, the cause and remedy, and the general instructions which have been issued to guard against these troubles are related to them. No applicant, however, is assigned to duty as a telegrapher until, in addition to the foregoing, he has himself passed a satisfactory written and oral examination. The examination of the other man is for him simply a preparation. In this way he goes to work not as a green hand but as one who has had 15 years of experience.

After passing examination on rules, he is seated at the telegraph examination table, furnished with train order signal, train order manifold, carbon sheets and stylus and required to receive orders in regular form in accordance with the rules on which he has just passed examination, displaying his train order signal, giving the proper responses, repeating the orders, etc., and drilled in this way until he can handle the orders rapidly and correctly and without any prompting. This done, he is ready for duty. If he is to be an agent, or perform clerical work, or fill high position as a telegrapher, he is sent to the division superintendent for inspection that the latter may know him before he goes to work. Otherwise he is sent direct to the agent at the station at which he is to serve.

No one under 21 years of age is made an agent, and none are appointed telegraphers under 18 years of age. If the position is one requiring bond, notice is immediately sent to the comptroller. In case of appointment to an important position as ticket agent or ticket seller, the approval of the general passenger agent is also obtained. Promotion to the position of agent is made from the ranks of telegraphers; when possible, brains being equal, preference is given to seniority of service. Train despatchers are generally made by promoting telegraphers in train despatcher's office. Candidates for telegraphers in despatcher's office are selected from the best material on the division.

When an agent is desired for one of the larger stations the traffic department is conferred with.

In addition to the personal record blank, a personal record is kept of every one connected with the telegraph and signal department from apprentice up, showing date of appointment, capacity, station, term of service, promotions, suspensions, errors, dismissals, etc. A telegrapher leaving the service for any cause is given a service letter addressed to himself stating the time and character of service and specifying the reason for leaving.

It takes from one to three days for a telegrapher to complete his examination. One day is sufficient for an experienced energetic man.

It has been our experience that a man who has reached the age of 18, after having passed the required examination, is fully qualified to handle train orders. In proportion to the number of men employed over 21, as against the same number between 18 and 21, the men over 21 are in the majority of those who have caused trouble in the operation of train movements.

The discipline of telegraphers is accomplished through the tel-

*A paper read before the Railway Telegraph Superintendents' Association at Atlantic City, June 19, by H. C. Hope, Superintendent of Telegraph and Signals, Chicago, St. Paul, Minneapolis & Omaha.

egraph and signal department and the division officers. It is the duty of the traveling telegrapher to observe how all matters pertaining to the telegraph and signal service are being conducted, to see that all signal lamps and lenses are cared for in a way to obtain the best results, that blocking between adjoining stations by signalmen, keeping of block records, handling of train orders and block cards and operation of block signals is properly done, correcting and instructing those who need it and making regular and systematic inspection reports to headquarters covering each office within his district. It usually takes three days for operators coming from other railroads having similar rules to ours to qualify and get acquainted with our methods, requirements, etc.

Each agent, telegrapher and apprentice telegrapher is furnished with a pamphlet entitled, "The Monitor," containing 100 questions and answers bearing upon matters pertaining to passenger traffic.

The Northern Pacific's Own Valuation.

The Northern Pacific has filed with the Interstate Commerce Commission statements and figures showing what it would cost to duplicate the railroad property and the cost of improvements. The table showing the estimated cost of reproducing the Northern Pacific Railroad at present follows:

	Miles.	
Main line and second tracks	2,860.67	
Branch line, spurs and sidings	4,834.12	
		7,694.79
Engineering, 5,785 miles at $1,500		$8,677,500
Right of way and station grounds		106,890,088
Grading		71,174,744
Tunnels		4,383,948
Bridging		20,344,934
Ties		13,810,326
Rails		27,563,754
Fastenings		3,656,095
Switches		1,181,250
Ballasting		8,238,758
Track laying		7,573,550
Fencing right of way		759,450
Cattle guards		289,250
Signal apparatus		167,862
Telegraph lines		1,445,013
Station buildings and fixtures		2,511,264
Roundhouses		3,972,125
Machinery and tools		1,100,000
Docks, wharves		1,454,450
Water stations		1,966,900
Fuel stations		636,350
Warehouses		2,886,076
Miscellaneous structures		2,299,668
Seattle terminal facilities		2,457,000
Ferry equipment		617,000
Legal expenses		289,250
General expenses		289,250
Interest		35,632,295
Contingencies		12,994,717
Total		$345,262,867
Average cost per mile		59,734
Average cost per mile, not including land		41,257

Right of Way and Station Grounds.

Large terminals.	Acres.	Total value.
Superior	982.62	$1,552,020
Duluth	600.91	5,155,204
Duluth Union Depot	6.94	420,625
St. Paul	676.97	9,579,177
Minneapolis	284.61	5,065,082
Spokane	422.31	7,240,293
Tacoma	680.84	12,160,000
Seattle	461.03	30,167,050
Butte	233.76	2,000,000
Everett	124.68	374,040
Bellingham	67.86	339,300
South Bend	35.63	249,419
Aberdeen and Hauquiam	69.83	698,300
Total	4,637.99	$75,000,501
Other right of way and station grounds	152,185.00	31,889,589
Total	156,822.92	$106,890,988
Average cost, right of way and station grounds, per acre		$209.53
Average cost, right of way and station grounds, per mile		$5,533

The cost of improvements on the estate of the Northern Pacific —total 7,694.79 miles—has been $302,815,326, and their present value is $288,695,095.

Annual Meeting of the Freight Claim Association.

The Freight Claim Association, which is composed of 330 railroads, steamship companies and fast freight lines, held its sixteenth annual session at Denver, commencing June 19th, 170 different carriers being represented. The first two days of the session were taken up in discussing and adopting the reports of the Committees on Constitution and By-Laws and Rules, perfecting and amending the constitution and the rules, the object being to simplify and expedite the manner and methods under which claims shall be handled, and determining the proportions in which claims shall be divided, and in perfecting the method of arbitrating claims when proper divisions are not agreed upon by the interested carriers. That is the corner stone of the Association, as without some plan by which claims in dispute between carriers could be arbitrated and finally disposed of the Association would be worthless.

The third day was largely devoted to the discussion of the principal business of the Association, which was the adoption of a new plan, which had been considered at a special meeting of the Association held at Cincinnati in February last, for the purpose of improving the methods now in force in relation to the matter of the investigation and settlement of freight claims. After discussion the matter was finally voted upon, the vote being taken by roads, and the plan received the necessary two-thirds vote of those present. Under the constitution of this Association no rule or by-law can be adopted unless it receives the vote of two-thirds of the members present. Below is a copy of the new plan, which takes effect September 1 next, on all claims presented on and after that date.

PLAN FOR SETTLING INTERLINE FREIGHT CLAIMS.

When claim is presented, it shall be investigated and settled on its merits, and in conformity with legal liability by carrier to whom presented.

Provided, when claim arises from fire, flood, wreck, act of Providence, act of public enemy, act of public authority, act of shippers, or inherent nature of goods, disaster on land or water, or marine loss or damage, papers shall be submitted for authority to Freight Claim Office of carriers deemed liable.

(*a*) Settling carrier shall investigate claim to establish validity and apportion liability.

Inquiry shall be addressed direct to agent of interested carrier whenever practicable, and to Freight Claim Officer only after failure to obtain information from agent or when necessary from nature of inquiry.

(*b*) When agent of another carrier fails to answer within twenty (20) days from date of inquiry, copy of inquiry, with request for reply, shall be sent by express, postal mail, or messenger, to Freight Claim Officer of delinquent carrier. When answer is not received within thirty (30) days to such request to Freight Claim Officer regarding a paid claim, paying carrier may, provided liability is not in its opinion located, charge full amount of claim to delinquent carrier, or if there are two or more delinquent carriers, then to delinquent carrier nearest paying carrier in direction of destination, and shall forward all papers relating to the claim to such delinquent carrier, who shall take the place of settling carrier, and make further investigation and distribution of amount of the claim.

(*c*) Claim shall be apportioned according to rules and rulings of the Freight Claim Association.

(*d*) Distribution Statement, Form —, shall be securely attached by paying carrier to each claim. When one carrier only is interested, statement and claim papers shall be set to it. When two or more other carriers are interested, original statement and claim papers shall be sent to most distant carrier and copy of statement showing disposition of claim papers to each other interested carrier. When paying carrier is an intermediate carrier, claim papers shall be sent to last interested carrier in direction of destination. Any interested carrier shall have the right to obtain papers from carrier with whom they are filed.

(*e*) When an amount charged in accordance with preceding paragraphs is for any reason unsatisfactory to debited carrier, it may be recharged to paying carrier within one year from date of first charge, and shall not again be charged until authorized or arbitrated. When interested carriers cannot agree on such recharge, amount shall be carried by paying carrier and case referred to Arbitration Committee for decision. Provided, that an amount not so recharged within one year as aforesaid shall not be subject to recharge except by agreement.

(*f*) No carrier shall be charged with an amount exceeding one hundred dollars ($100.00) on any one claim, until claim papers have been submitted to its Freight Claim Officer, and authority for such charge given.

(*g*) Claim in which non-member line is interested does not come under this rule.

(*h*) Fast Freight Line ogranizations handling claims shall be considered as carriers.

The following covers the accounting features of the plan tentatively adopted at Cincinnati:

SETTLEMENT OF INTERLINE CLAIMS BETWEEN CARRIERS.

The following plan, having been endorsed by a committee of the Association of American Railway Accounting Officers, is recommended to members of The Freight Claim Association:

On or before the 10th of each month, or weekly by special agreement, if necessary, to avoid a large accumulation), paying carrier shall render a statement on Form — of amounts due from each debtor carrier, with claim papers and distribution statements, to Freight Claim Officers as provided for in Freight Claim Association Rules, by express, postal mail or messenger. Draft may be made on or after the 25th of month for total of statement, or for balances as may be agreed upon by the interested carriers, which shall be paid by debtor carrier upon presentation.

While the plan is by no means perfect, it is believed by a large majority of the Association that it will bring about more expeditious methods in the settlement of interline claims and to a great extent wipe out the large suspense accounts, which are now being carried by nearly every railroad in the country.

A rule in relation to what constitutes delivery of cars to connecting line was adopted by the Association, having been agreed upon by a joint committee composed of representatives of the American Railway Association, Master Car Builders' Association, and the Freight Claim Association. The rule is as follows:

"Cars shall be considered as having been delivered to connecting railroad when placed upon track agreed upon and designated as the interchange track for such deliveries, said cars to be in safe, serviceable condition and accompanied or preceded by regular waybill or running slip, the receiving road to be the judge in cases not provided for in the Master Car Builders' rules, all defects existing at time of delivery to be designated by receiving road when car is first tendered, the liability for per diem for value of car and contents to commence immediately upon placing car on track for delivery and continue until car has been inspected and accepted or rejected by receiving line."

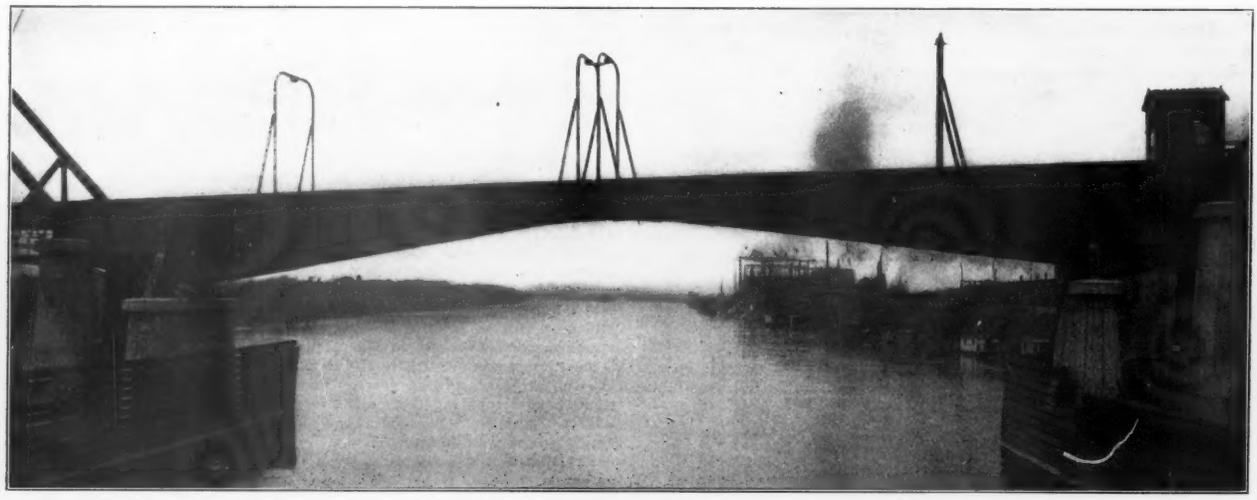
The committee on arrangements, consisting of Messs. Writer, Tucker, Wing, H. A. Johnson, Jones and C. A. Johnson, of the

Colorado railroads, provided an elaborate programme for the entertainment of the members of the Association and their families, and most royally carried out the plans. A single pass, good for a month and bearing nine signatures, passed the members and their families over all the Colorado roads.

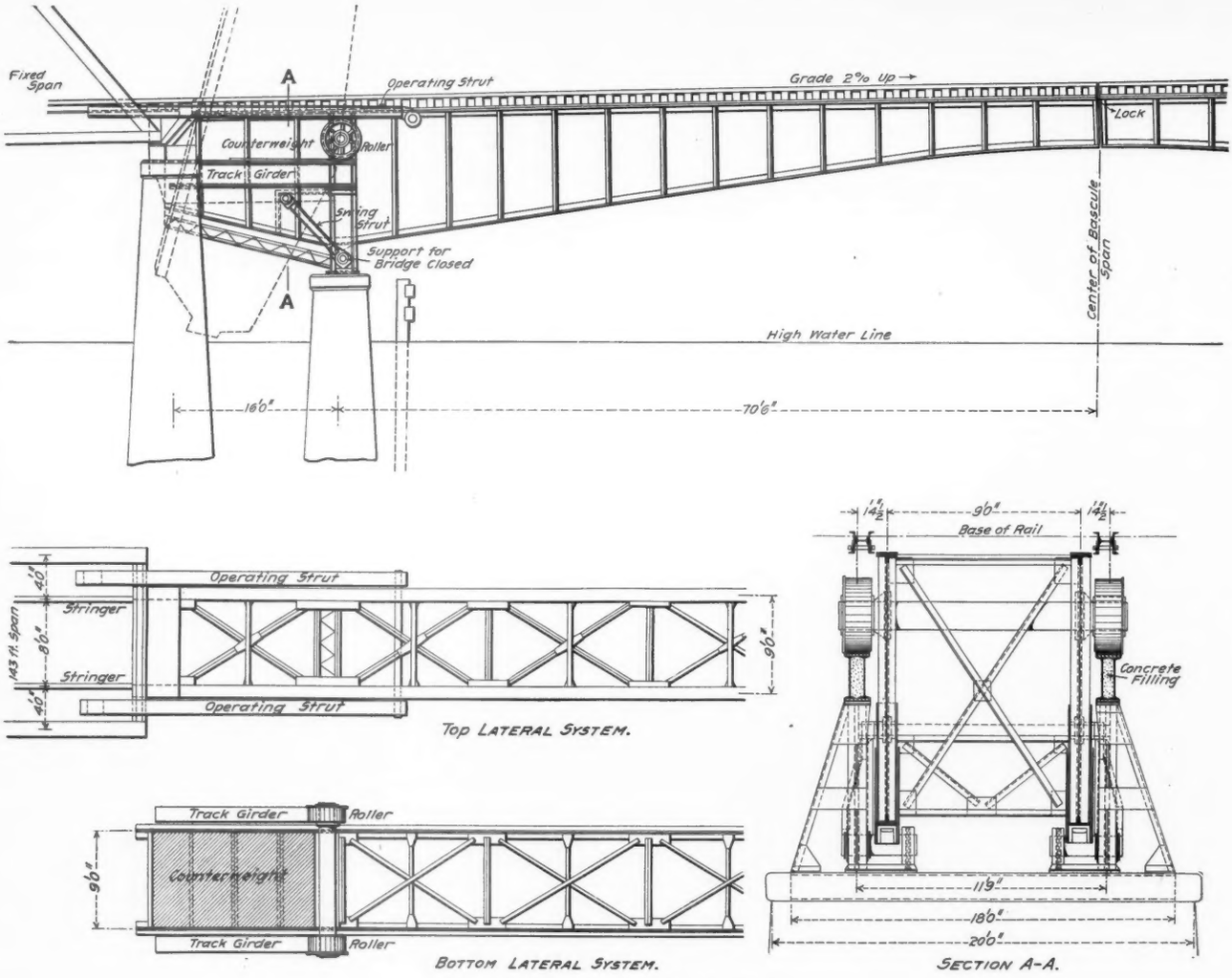
The next meeting of the Association will be held at Atlantic City in June, 1908. The officers elected were: R. C. Richards (C. & N.-W.), Chicago, President; W. S. Battle, Jr., (N. & W.), First Vice-President; J. S. Tustin (Mo. Pac.), Second Vice-President; W. P. Taylor (R., F. & P.), Secretary.

Rall Bascule Bridge over the Illinois River at Peoria.

A double-leaf bascule bridge of the Rall type, the second of this type of bridge to be built, was completed recently at Peoria, Ill. The first Rall bridge is on the Pittsburg, Fort Wayne & Chicago line of the Pennsylvania Lines West of Pittsburg, across the Miami and Erie canal at Delphos, Ohio. It is a single-leaf, double-track span, 26 ft. 2½ in. between supports, and has been in service several years. The Peoria bridge is the draw span for the Illinois river crossing of the McKinley Interurban Syndicate. It consists of



Rall Bascule Span in the Illinois River Bridge at Peoria for the McKinley Interurban Syndicate.



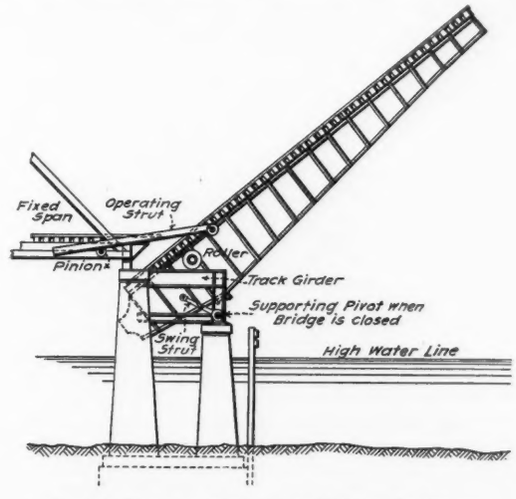
Details of Rall Lift Bridge at Peoria.

four riveted through truss spans 142 ft. 10 in. center to center of piers, and the bascule span, which is 173 ft. center to center of back piers. The span between supports is 141 ft. and the clear opening at right angles to the river channel is 125 ft. It is a double-leaf deck bridge, requiring no tail pits, as the grade is high above the water line, the head-room at high water being 10 ft. 6 in.

Photographs and general drawings of the bascule span are shown herewith. The features peculiar to this type of lift bridge

Rall Bascule Bridge in Open Position.

are as follows: The leaf is so counterweighted that the center of gravity coincides with the center of the roller shaft around which the leaf rotates. Each leaf has a pair of swing struts connected to the pier at one end and to the main girders at the other; also a pair of operating struts, which in the closed position are just outside of and approximately parallel to the top of the girders. On the bottom face of each operating strut is a rack which gears with a pinion back of the back pier, shown in the sketch of bridge in half-



Sketch Showing Lift in Half Open Position.

open position. These pinions are driven by a 25-h.p. motor, there being one for each leaf.

In the closed position the bridge rests upon fixed supports on the piers and the rollers are lifted slightly above the track, and therefore are relieved of any load. When the leaf starts to open it first rotates around the point of fixed support until the rollers come to bearing on the track girders. Then as the pull on the operating struts continues, the swing struts, moving in the arc of a circle, draw the tail downward, and the entire leaf rolls back horizontally along the track girders as it revolves. The bridge is opened and closed in three-quarters of a minute. Including the insertion of the tail and rail locks for both leaves, a complete operation requires two minutes. The operating machinery is below the deck, nothing showing above except the operator's house and the trolley poles and lines.

The advantages claimed for this type of bascule bridge are summarized as follows:

1. For the bridge closed the length of span is a minimum and equal to the distance center to center of river piers.

2. The length of travel of the bridge is a minimum, being just sufficient, so that the tail part containing the counterweight will clear the river pier when the bridge is fully open.

3. The shop work on the bridge proper is simple and of a character that can readily be turned out by a bridge shop having ordinary facilities.

4. The wheels or rollers on which the bridge moves are solid steel castings having smooth treads. These castings may be made of any proportions that will be suitable. There are no rivets to give out. There is nothing to bind and the motion is smooth and noiseless.

5. The track girders for the Peoria bridge are double 24-in. I-beams, with flange plates on top and bottom and track plates riveted to the top.

6. Should it be desirable to remove or repair the wheels it can readily be done, as the bridge in the closed position does not bear upon the wheels. For the same reason the track girders also can easily be removed or repaired without disturbing traffic over the bridge.

7. Besides the foregoing advantages, this type of bridge is very economical both as to quantities and cost.

The bascule bridge was designed and the superstructure built by the Strobel Steel Construction Company, Chicago. The engineer for the McKinley Syndicate is Ralph Modjeski, Chicago. Four additional bridges of the Rall type, with through instead of deck girders without pits, are being built by the Strobel Company at Indiana Harbor, Ind. Two are for the Lake Shore & Michigan Southern, one for the Baltimore & Ohio and one for the Pennsylvania Lines. They are single-leaf, double-deck spans, 86 ft. between supports.

The Elliot Junction Collision.

The British Board of Trade has published its report on the disastrous rear collision which occurred in a snowstorm in Scotland, December 29, when 22 passengers and employees were killed; and the accident appears to have been due principally to the fact that the engineman was under the influence of liquor. The report was issued late in April, but it is dated February 26. It says nothing about the punishment of the engineman, but from a recent press despatch it appears that he was sentenced to five months' imprisonment on a charge of manslaughter. This sentence was subsequently reduced by the court to three months. The place where this collision occurred was Elliot Junction, on the Dundee & Arbroath Joint Railway, owned jointly by the Caledonian and the North British companies. The negligent driver, George Gourlay, is 60 years old and has been in the service 47 years, with a good record.

While the explanation of the collision is thus in a sense quite simple, the 50-page report of Major J. W. Pringle gives many circumstances which will be of interest to the American reader. Major Pringle gives his conclusions under seven heads: (1) the situation on the line; (2) the driver and his conduct; (3) a discussion of the different explanations offered to account for the collision; (4) precautionary methods which might have been adopted; (5) minor matters; (6) summary of conclusions, and (7) proposals for the prevention of such collisions.

The train was running from northeast to southwest, and the engine was moving backward. The coal, piled high on the tender, interfered somewhat with the engineman's view ahead. The train had started from Arbroath about 3.14 p.m., and after running 1½ miles it struck a standing train at Elliot Junction, having passed distant and home signals which were against it. Owing to the severe and unusual snow and wind, block working had been suspended and the train was running under a "time interval and caution" rule, the requirement being practically that enginemen run constantly under control. The standing train had been held at Elliot Junction because of the derailment of a freight train a short distance ahead. The station master had just decided to take the passengers out of the standing train, but the collision occurred before this purpose could be carried out.

It appears that Engineman Gourlay had been repeatedly warned that block working had broken down, both wires and poles having

failed. The preceding train had been gone from Arbroath 10 minutes.

In discussing the time interval rule Major Pringle says that safety is dependent, firstly, on the preservation of a time interval, and, secondly, caution on the part of engine drivers. He lays no responsibility on the leading train.

The chief guard of this passenger train was riding in his van next to the engine, and says that he could see nothing at all out of his window; for the last half of the journey from Arbroath the speed was increased, he estimated, from 20 miles an hour to 25 or 30.

The Government inspector tries to fix the exact time that the collision occurred, and makes detailed comparisons of clocks, but, as in most other cases of this kind, his conclusions concerning the accuracy of different clocks and, as deduced therefrom, the speed of the train, are of little or no value.

The signals approaching Elliot Junction are 35 to 40 ft. high with the sky for a background. The engineman made some claim that the signals were off, but the distant signal had not been used since the night before, so it is hardly possible that it was workable at this time. Many of the signals drooped, and three minutes after the collision the home signal drooped 10 deg., but it was clearly a danger signal.

Under the head of explanations, Major Pringle considers first the suggestion that Gourlay had lost his way; but there are many landmarks along the line, and this theory is untenable. The coal on the tender made an obstacle, but with such high semaphore signals the view is not seriously obstructed. Running with the tender ahead is objectionable, but Major Pringle does not lay down an absolute rule condemning the practice; though the management of the road is warned that it is resorted to more frequently than is necessary; it should be discouraged. The reason that this engine was not turned was that the turntable was obstructed by snow, but the inspector holds that if the station agent or the engineman had really been determined to have the engine turned, it would have been reasonably possible, though the trackmen were overworked at all points and many switches and crossovers, covered deep with snow, had been neglected. Several other enginemen had run their engines backward that day with success.

After the collision Gourlay was pinned down in his cab for half an hour. He was then taken out and soon after given by some one three-quarters of a glass of brandy. Shortly afterward a policeman noticed his apparently intoxicated condition and called three physicians to examine him. These doctors concluded that this brandy which he took after the collision was not sufficient to fully account for the alcoholism observed. Before leaving Arbroath, Gourlay's train had been standing at or near the station about three or four hours, and at one time the cab of the locomotive was filled with passengers. Gourlay had drank out of a bottle in the cab, apparently brought there by some passenger, and he had been treated to 3 pence worth of whisky at the Victoria bar, which was close to the platform. A porter and two other men who saw Gourlay in the cab at one time thought he had been or was going to be sick. Yet when he ran his engine around the train, just before starting, he performed the operations with all reasonable steadiness and care. In the face of the conflicting evidence Major Pringle finds it "a difficult and invidious task" to decide as to Gourlay's condition. The inspector says:

> His previous record and character, as well as his behavior on the downward journey, prove that he was normally a careful driver. There must be some reason to account for the unusual carelessness shown on the upward journey. If it is true that he took no more than two half-glasses of whiskey, whilst waiting at Arbroath, it is evident that this amount of alcohol could not have caused the effects noticed by Morrison, Briggs and Whitton. There is nothing to show that he was out of health, or suffering from any illness, which would account for the strangeness in his appearance and conduct which they observed. He was accustomed to work his train from Arbroath to Dundee as an express, without stopping at any intermediate stations. It is possible that he did not fully understand the special intructions given to him on this occasion. Confusion of ideas or deadening of faculties may account for his conduct. The evidence suggests no cause for such confusion, or lack of alertness, other than the bemusing effects of either extreme cold or of alcohol. The cold, admittedly severe, more especially in the unprotected position of tender-first, could hardly, in so short a time as two or three minutes, have alone produced such a serious effect on a robust constitution. I have, therefore, most reluctantly, been forced to accept the alternative, and give it as my opinion that the lack of intelligence or of caution and alertness, displayed by driver Gourlay on this occasion were in part, at all events, induced by drink, the effects of which may possibly have been accentuated, after he left Arbroath, by exposure to weather.

Considering now possible precautionary measures, Major Pringle decides that when block working has broken down all semaphores should be kept at danger, and the signals to enginemen be given by hand. There is no general rule on the Joint line, and some of the signalmen did this while others did not. At Elliot Junction the home signals were used to admit trains to the station. This should not have been done. All of the arms were in an imperfect position. Where a driver, reaching a home signal, is not near enough to see a flag in the signal box a flagman should be appointed to stand at the signal. In a blinding snowstorm fogmen with torpedoes should be stationed at the distant signals, but this was not done in this case, and it appears that the Joint line has always done without fogmen. The explosion of a torpedo at the distant signal would, in all probability, have prevented this collision by arousing Gourlay. The claim that the guard of the standing train at Elliot Junction should have sent out a man with torpedoes is not admitted. Major Pringle holds that a train protected by home and distant signals, as in this case, need not send out a man.

Under his fifth head Major Pringle criticises a general inefficiency which he found in many things. Telegraph and telephone communication was interrupted, but the station agents, inspectors and others took little care to keep in touch with each other by extemporized methods. The derailed freight train blocked one track at 8 a.m., but systematic single-track working on the other track was not established until 2 p.m. Certain superintendents interested were not advised of this disaster until after 11 p.m. The Joint line is 17 miles long. There are 95 men employed on the track; but this was the worst storm known in 15 years, and somebody ought to have engaged additional men, if possible. Snow plows were run over the road backward because turntables were not properly cleared of snow. The Joint line has no cars or engines of its own, and the separate roads each send their own men over it. This leads to division of responsibility and to poor discipline. Wrecking cars and even jacks are insufficient and not properly located. Evidence of lack of discipline appeared from the presence of passengers in the cab of the engine at Arbroath; and the proximity of the Victoria bar is "a very undesirable feature."

Under the sixth head driver Gourlay is found to have received repeated and very explicit instructions to drive with caution and to stop at all stations. He passed the distant and home signals at Elliot Junction without having applied his brake, and ran 400 ft. beyond the home signal. The proper place for him to come to a full stop was about 300 ft. farther. It is evident that he was not prepared to stop at the platform. He broke the rules in leaving his engine while waiting at Arbroath, and his disregard of discipline, with other circumstances, forces the inspector to "conclude, most unwillingly, that his conduct was to some extent due to the effects of alcohol." He had been on duty about nine hours. The inspector then goes on to summarize other points mentioned above; and next, taking up his seventh section, considers, first, speed indicators, which are largely used on Continental railways and which in some countries are required on all engines. Speed indicators have been improved so that now they are reliable, but there is no evidence that they would be useful in the prevention of collisions like this. The driver himself must determine the speed which particular circumstances call for.

A third man in the cab is next considered, but the expense of this would be a serious obstacle, and there is not much space available in the cab. Unless the complete control of the steam and brake gear is placed in the hands of the third man, it will be difficult to hold him primarily responsible for safety; and if we do thus hold him, then he will be in exactly the same position as a driver is at present, and the office of driver would practically become a sinecure; therefore, Major Pringle does not support this suggestion. It would be better to adopt automatic stops. These are now in use on the underground railways in London, and have been found reliable at speeds as high as 35 miles an hour. Other railroads are trying automatic fog machines and bells and whistles on engines. None of these arrangements, however, have yet stood the test of time sufficiently long to be at present accepted as fully reliable. It has been proposed to have larger and stronger poles for the electric wires, so as to prevent the failure of block working; but Major Pringle thinks the only practicable remedy would be to have poles set nearer together. Putting wires under ground is the best remedy, but that would be very costly, and only in exceptional circumstances would the expense be justified.

Salaries on Hungarian State Railroads.

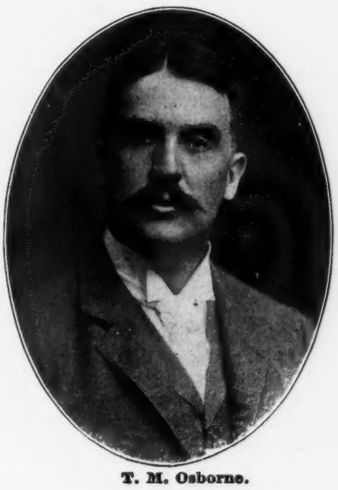
The Hungarian State Railroads have recently adopted a new scale of salaries for their officials. With each salary is an allowance for house rent, and this allowance varies with the localities where the employee is stationed. The officials of lowest class are to receive $320 to $480 per year, with allowances of $80 to $160 for rent. Such of them as are graduates of technical schools have a minimum salary of $460. There are two classes of engineers, with $580 salary and $180 house money for the lower and $760 salary and $200 house money for the higher class. Moreover, engineers of the latter class are entitled to an advance of $60 a year after five years and another $60 after 11 years' service. A "chief engineer" has $1,000 a year and $250 house money. Three grades of superintendents have $1,080, $1,200 and $1,320 a year, with $210 to $300 house money; "general superintendents" get $1,440, $1,560 and $1,680 salary, with $320 to $360 house rent; a general manager, $2,400 salary and $500 house rent; while the President has $3,000 salary and $600 house rent. The offices are not quite the same as those designated by these names in this country.

Four New York Public Service Commissioners.

William R. Willcox was born at Smyrna, N. Y., in 1863. He was educated at the University of Rochester and at Columbia Law School. In 1900 he was a candidate on the Republican ticket for Congressman from the Thirteenth district, but was defeated by a small majority. Later he was appointed to the New York City Park Commission by Mayor Low. While in this office he did much to establish public playgrounds, gymnasiums and parks. He was appointed Postmaster of New York City in 1905. Mr. Willcox is President of the Grand River Irrigation & Development Company and of the Willcox Canal Company.

Thomas Osborne, of Auburn, N. Y., was born in that city in 1859. He was educated in the Auburn public schools and Adams Academy at Quincy, Mass., and graduated from Harvard University in 1884. He then began work in his father's farm tool factory, of which later he became the head. He was a member of the Auburn Board of Education from 1885 to 1888, and also from 1893 to 1896. He was a delegate to the Democratic National Convention in 1896, and ran for the office of Lieutenant-Governor on the Independent Citizen Union Ticket in 1898. From 1902 to 1905 he was Mayor of Auburn. Mayor Osborne has always been greatly interested in prison reform and in the workings of the Civil Service law. In a speech which he made before the Civil Service Reform this spring, he showed with earnestness and breadth of view the difficulties which strict enforcement of civil service tenure places on officials whose primary concern is efficient administration.

W. R. Willcox.



T. M. Osborne.

M. S. Decker.

James E. Sague.

James E. Sague, of New Hamburg, was born in Poughkeepsie, N. Y., in 1862. He was educated at the public schools and graduated as a Mechanical Engineer from Stevens Institute in 1883. He began railroad work on the Chicago, Burlington & Quincy, and afterwards went to the Erie. He spent two years on the Jamaica Railroad in the West Indies, and then went to the Schenectady Locomotive Works of the American Locomotive Company. He was Chief Mechanical Engineer of this company for six years, and was then made Assistant Vice-President and finally First Vice-President in charge of Engineering and Manufacture. He resigned this position on March 1 of the current year.

Martin S. Decker, of New Paltz, is now Assistant Secretary of the Interstate Commerce Commission. He was born at Rosendale in 1858. After a public school education he began work as a telegrapher. He later studied law and held several positions in Ulster County, when he was made Assistant Secretary to the Interstate Commerce Commission in 1887, and has frequently taken evidence as a Deputy Commissioner.

The Italians have made the discovery that one of the results of sundry reductions of railroad rates, accompanied by increases in wages of employees, both prescribed by law, has been an increase in the percentage of working expenses. Thus, gross earnings increased 23½ per cent. from 1895 to 1901, and 37 per cent. from 1901 to 1907; but meanwhile wages increased 12½ per cent. in the first period and 45 per cent. in the last, when the advances in pay and reductions in rates took place. The working expenses, which were 66 per cent. of the gross earnings in 1895 and 69½ per cent. in 1901, will be 70 per cent. the current year (ending with June). The pay of employees absorbs 40 per cent. of the earnings this year. Of the increase of earnings in the first period, 22 per cent. went to the employees; in the second period, 45 per cent. The chief changes in wages were made before the state began to work the railroads two years ago.

American Society for Testing Materials Specifications for Steel Rails.

At the annual meeting of the society in 1906 the report of Committee A on standard specifications for steel rails was referred back to the committee with instructions to report at the next annual meeting proposed standard specifications for steel rails which would give promise of correcting as far as possible the defective quality of rails obtained under existing specifications. A sub-committee consisting of W. A. Bostwick, P. E. Carhart, Charles B. Dudley, E. F. Kenney, Edgar Marburg, George E. Thackray and W. R. Webster, was appointed to prepare these specifications, which were accepted at the last meeting and referred to letter ballot for adoption.

STANDARD SPECIFICATIONS FOR STEEL RAILS.

(1) (a) The entire process of manufacture and testing shall be in accordance with the best current practice, and special care shall be taken to conform to the following instructions:

(b) Ingots shall be kept in a vertical position in the pit heating furnaces until ready to be rolled or until the metal in the interior has time to solidify.

(c) No bled ingots shall be used.

(d) There shall be sheared from the end of the blooms formed from the top of the ingots not less than — per cent., and if, from any cause, the steel does not then appear to be solid, the shearing shall continue until it does.

(2) Rails of the various weights per yard specified below shall conform to the following limits in chemical composition.

	Per cent.				
	50 to 59 lbs.	60 to 69 lbs.	70 to 79 lbs.	80 to 89 lbs.	90 to 100 lbs.
Carbon	0.35-0.45	0.38-0.40	0.40-0.50	0.43-0.53	0.45-0.55
Phosphorus shall not exceed	0.10	0.10	0.10	0.10	0.10
Silicon shall not exceed	0.20	0.20	0.20	0.20	0.20
Manganese	0.70-1.00	0.70-1.00	0.75-1.05	0.80-1.10	0.80-1.10

(3) One drop test shall be made on a piece of rail not less than 4 ft. and not more than 6 ft. long, selected from every fifth blow of steel. The test shall be taken from the top of the ingot. The rail shall be placed head upwards on the supports, and the various sections shall be subjected to the following impact tests under a free falling weight:

Weight of rail, lbs. per yard.		Height of drop.
45 to and including	55	15 ft.
More than 55 " " "	65	16 "
More than 65 " " "	75	17 "
More than 75 " " "	85	18 "
More than 85 " " "	100	19 "

If any rail break when subject to the drop test, two additional

tests, taken from the top of the ingot, will be made of other rails from the same blow of steel, and if either of these latter tests fail, all the rails of the blow which they represent will be rejected, but if both of these additional test pieces meet the requirements, all the rails of the blow which they represent will be accepted.

(4) The number of passes and speed of train shall be so regulated that on leaving the rolls, at the final pass the temperature of the rail will not exceed that which requires a shrinkage allowance at the hot-saws, for a 30-ft. rail of 100 lbs. section, of $6^{11}/_{16}$ in., and $^1/_{16}$ in. less for each 5 lbs. decrease of section. These allowances to be decreased at the rate of .01 in. for each second of time elapsed between the rail leaving the finishing rolls and being sawn. No artificial means of cooling the rails shall be used between the finishing pass and the hot-saws.

(5) The drop testing machine shall have a tup of 2,000 lbs. weight, the striking face of which shall have a radius of not more than 5 in., and the test rail shall be placed head upwards on solid supports 3 ft. apart. The anvil block shall weigh at least 20,000 lbs., and the supports shall be part of, or firmly secured to, the anvil. The report of the drop test shall state the atmospheric temperature at the time the test was made.

(6) The manufacturer shall furnish the inspector, daily, with carbon determinations for each blow, and a complete chemical analysis every 24 hours, representing the average of the other elements contained in the steel, for each day and night turn. These analyses shall be made on drillings taken from a small test ingot.

(7) Unless otherwise specified, the section of rail shall be the American standard, recommended by the American Society of Civil Engineers, and shall conform, as accurately as possible, to the templet furnished by the railroad company, consistent with paragraph No. 8, relative to specified weight. A variation in height of $^1/_{64}$ of an inch less, or $^1/_{32}$ of an inch greater than the specified height, and $^1/_{16}$ in. in width will be permitted.

(8) The weight of the rails will be maintained as nearly as possible, after complying with paragraph No. 7, to that specified in contract. A variation of one-half of 1 per cent. for an entire order will be allowed. Rails shall be accepted and paid for according to actual weights.

(9) The standard length of rails shall be 30 ft. Ten per cent. of the entire order will be accepted in shorter lengths, varying by even feet to 24 ft., and all No. 1 rails less than 30 ft. shall be painted green on the end. A variation of one-fourth of an inch in length from that specified will be allowed.

(10) Circular holes for splice bars shall be drilled in accordance with the specifications of the purchaser. The holes shall accurately conform to the drawing and dimensions furnished in every respect, and must be free from burrs.

(11) Straightening.—Care must be taken in hot-straightening the rails, and it must result in their being left in such a condition that they shall not vary throughout their entire length more than 5 in. from a straight line in any direction when delivered to the cold-straightening presses. Those which vary beyond the amount or have short kinks shall be classed as second-quality rails and be so stamped.

The distance between supports of rails in the gagging press shall not be less than 42 in.

Rails shall be straight in line and surface when finished—the straightening being done while cold—smooth on head, sawed square at ends, variation to be not more than $^1/_{32}$ in., and, prior to shipment, shall have the burr occasioned by the saw cutting removed, and the ends made clean. No. 1 rails shall be free from injurious defects and flaws of all kinds.

(12) The name of the maker, the weight of rail and the month and year of manufacture shall be rolled in raised letters on the side of the web, and the number of blow shall be plainly stamped on each rail where it will not subsequently be covered by the splice bars.

(13) The inspector representing the purchaser shall have free entry to the works of the manufacturer at all times when the contract is being filled, and shall have all reasonable facilities afforded him by the manufacturer to satisfy him that the finished material is furnished in accordance with the terms of these specifications. All tests and inspections shall be made at the place of manufacture prior to shipment.

(14) No. 2 rails will be accepted up to ten (10) per cent. of the whole order. Rails that possess any injurious defects, or which for any other cause are not suitable for first quality, or No. 1 rails, shall be considered as No. 2 rails; provided, however, that rails which contain any physical defects which impair their strength shall be rejected. The ends of all No. 2 rails shall be painted white in order to distinguish them.

Mr. Webster in presenting the specifications, said:

If the important factors that have a direct bearing on the quality of the finished rail are considered, most of the conflicting opinions can be harmonized. The committees at work on the problems are doing this. They are endeavoring to secure good uniform methods of manufacture by specifying chemical composition, amount of discard from top of ingot, finishing temperature in rolling, limit of camber in rails coming to the gag press for cold straightening, and drop tests. They are nearer together now on these requirements than ever before, and it is to be hoped that a specification will soon be arrived at, by interchange of views, which will be acceptable to all.

It must be admitted that the best rails are produced from steel low in phosphorus, rolled with light reductions and finished at proper low temperature; but the sections now in use make it almost impossible to continue the work of rolling on the head to a low enough temperature to produce the fine grained structure desired. Therefore, a good starting point for discussion would be in reference to section.

In a recent discussion it was claimed that the old committee of the American Society of Civil Engineers kept in mind the importance of low-finishing temperature, in designing their rails, and gave sections best suited for that purpose. As a matter of fact, the effect of the heat treatment of steel was not properly appreciated at the time the committee made its report, in 1892, and the sections do not permit of a low enough finishing temperature in rolling, owing to the wide, thin flanges. This, to a large extent, has caused the great trouble with 100-lb. rails rolled to these sections. Other 100-lb. sections gave trouble, and on March 25, 1901, I wrote to the American Society of Civil Engineers, asking for a new rail committee to investigate and report on standard rail sections. The committee was appointed in 1902. It is still struggling with the problem. In the arguments against the appointment of such a committee it was claimed that sufficient evidence had not been produced to show that the heavier rail sections were not giving as good results as the lighter. Those present to-day must admit that the results of the past five years have given conclusive evidence that a change in section is advisable.

It has been the invariable experience in changing from a light to a heavy section in any class of rolled steel, that difficulties have been met and modifications have been made in the methods of rolling, in order to get as good a structure in the heavier section as was formerly obtained in the lighter section. In ordinary sections other than rails, it was a comparatively easy matter to overcome the trouble and get a good structure; but the thin flange of the rail and the higher carbons called for in the heavier sections further complicate matters.

If a rail with the same width of head as the present American Society of Civil Engineers 100-lb. rail is required, the head will have to be made thicker and the radius under the head larger, in order to prevent the sides of the head from shearing or breaking off, as at present, and more metal put in the web and flange in order to carry the heat and thus allow the head to be finished at the proper low temperature. This would mean a rail of 120 to 125 lbs. per yd. I believe we are coming to heavier rails before we get rid of our present troubles.

In all justice, it must be admitted that a fair percentage of breakages is caused by the great increase of wheel loads since 1892, increase in speed of trains, use of large capacity steel cars; also that we do find poor track, poor rail joints, driving wheels not properly counterbalanced, flat wheels, etc. These conditions will no doubt be improved, but they must be considered in deciding on the rail for the future.

Open-hearth steel rails of the present weight and section, rolled under the present conditions of manufacture, cannot be relied on to overcome all troubles. Most of the basic open-hearth steel manufactured in this country is much lower in carbon than is required for rail steel, and it is therefore much easier to control the uniformity of such steel. The common practice of Bessemer steel rail mills is to allow 10 points leeway in carbon, and some of the basic open-hearth mills claim to work within these limits, but even as high as 18 points leeway has been asked. It is easier to work within narrow limits of carbon in the acid open-hearth steel process than in the basic.

What is wanted is a steel as nearly uniform in carbon and other chemical elements as possible without inflicting too great hardship on the manufacturer. We desire full expression of opinion from the basic open-hearth steel manufacturers as to just what chemical requirements and limits they would agree to work to in rail steel.

It would be a very simple matter to roll a thousand tons of extra heavy rails of basic open-hearth steel, and one thousand tons of the same section of Bessemer steel, with enough metal in the web and flange to finish them in rolling at the lowest possible temperature without injuring the metal in the flange. In other words, approach as nearly as possible the rolling conditions of the old bullhead rail, which has been rolled with only 4½ in. shrinkage allowance in a 30-ft. rail. Let the chemical composition, per cent. of discard, and conditions of manufacture be in accordance with best modern practice. The expense of preparing rolls and rolling such rails would be trifling in comparison with the information obtained, and the rails would be better than any heavy rails ever rolled.

Recommended Uniform Car Service Rules.

The following uniform car service rules were adopted by the National Association of Car Service Managers in annual convention at Cincinnati, Ohio, May 28-30, 1907, and were recommended for adoption by all railroads. The first set of similar rules was recommended by this association in 1902. These were revised in 1904 and have been further revised this year. They are, however, substantially the same as those twice previously recommended. The proposed rules follow:

RULE 1.

CARS SUBJECT TO RULES.

(A) Cars held for or by consignors or consignees, for loading, unloading, forwarding directions, or for any other purpose are subject to the following car service rules.

(B) Cars loaded with live-stock, and through consignments not held for orders are not subject to these dules.

RULE 2.

TIME ALLOWED.

(A) On all commodities for loading or unloading, forty-eight (48) hours (two days) will be allowed.

(B) On cars re-consigned, held or stopped in transit upon request of consignor or consignee, or by reasons attributable to them, twenty-four hours, one day, will be allowed.

(C) When cars are interchanged with minor railroads or industrial plants performing their own switching service, they handling cars for themselves or other parties, an allowance of twenty-four (24) hours (one day) will be made for switching in addition to the regular time allowed for loading or unloading, the time to be computed from first 7 a. m. following delivery upon interchange tracks until return thereto.

(D) Freight in bond will be allowed forty-eight (48) hours (two days) for removal after permit to receive goods is issued to consignee by Collector of Customs.

(E) Cars containing freight consigned locally to the ocean or gulf ports, will be subjected to the forty-eight (48) hour car service rule, except that on shipments for coastwise movement via steamers and all freight for foreign export a maximum of ninety-six (96) hours will be allowed when the terminal agent is advised within forty-eight (48) hours after arrival of freight that such disposition will be made of same, the railroad reserving the right to unload the cars at any time it may see proper.

RULE 3.

COMPUTING TIME.

NOTE.—In computing time, Sundays and legal holidays are excluded.

(A) Time will be computed from the first 7 a. m. after cars are placed on public delivery tracks for loading.

(B) Time will be computed from the first 7 a. m. after notice of arrival when cars are held for orders, and from first 7 a. m. after placing on public delivery tracks when cars are held for unloading.

(C) On cars to be delivered on private tracks time will be computed from the first 7 a. m. after placing on such tracks, or after notice to consignee of readiness to so place the same.

(D) The placing of a car upon a private track, or notice to consignee of readiness to so place the same, shall be considered notice of delivery.

(E) Prompt notice shall be given by agents to consignees of the arrival of all freight subject to these rules.

RULE 4.

CAR SERVICE CHARGES.

(A) At the expiration of time allowed a charge of $1.00 per car per day or fraction thereof will be collected for detention of all cars held for loading or unloading, or subject to order of consignor, consignee or their agents.

(B) When both cars and tracks are owned by the same private party no charge will be made while cars are on such private tracks.

RULE 5.

PLACING CARS.

(A) Cars containing freight to be delivered on public delivery tracks or private sidings shall be placed immediately upon arrival, or as soon thereafter as the ordinary routine of yard work will permit. When delivery cannot be made on specially designated tracks, on account of such tracks being fully occupied, or for any other reason beyond the control of the carriers, delivery shall be made at the nearest available point.

(B) Cars for unloading shall be considered placed when such cars are held awaiting orders from consignor or consignee, or for the payment of freight charges, or surrender of bill of lading.

(C) The delivery of cars consigned or ordered to private tracks shall be considered to have been effected when such cars have been placed on the tracks designated, or if such tracks be full, when the railroad tenders cars by giving written notice of their arrival.

(D) Cars for loading shall be considered placed when such cars are placed, or held upon orders of shippers.

(E) If a car is placed for unloading and is reloaded by the same party each transaction shall be considered as independent of the other. If loading is begun before unloading is completed, car must be recorded as released from unloading, and placed for loading at the time loading is begun, and the time for loading will be computed from first 7 a. m. thereafter.

(F) When empty cars placed for loading on orders are not used, car service will be charged from first 7 a. m. after placing or tender, until released, with no time allowance.

RULE 6.

DECLINING TO RECEIVE CARS FROM CONNECTING LINES.

In cases where any railroad is unable or unwilling to receive freight tendered by another to be placed for delivery, it shall promptly notify the line tendering of its inability to receive, in order that proper notice may be given to consignee or consignor that delivery cannot be effected, and that request may be made for other disposition of the freight. Should such freight not be disposed of within time allowed after notice has been served upon consignee or consignor in accordance with the above, car service will be charged.

RULE 7.

CLAIMS.

Claims for relief or refund of charges accruing under these rules should in each case plainly state upon what ground any refund or relief is requested. Paid expense bills must be attached to claims for refund.

Car service charges may be refunded, waived, or cancelled under the following conditions:

(A) In case of overcharge or error in the assessment of charges.

(B) In case of failure on the part of the delivering railroad to properly handle freight, when such failure is directly responsible for the charges.

(C) In case extreme cold weather, rain or snow interferes with or prevents the loading or unloading of freight within the time allowed by these rules.

(D) In the event of unavoidable failure or breakdown of the machinery necessarily used in the loading or unloading of cars, when charges directly result from such failure, or breakdown, a refund of fifty (50) per cent. may be made.

(E) In case fires or strikes interfere with or prevent loading or unloading of freight, a refund or cancellation of fifty (50) per cent. may be made.

(F) In case freight cannot be disposed of by sale for sufficient amount to realize both freight and car service charges.

(G) In case of bad order, cars held on minor o rindustrial railroads for repairs, refund or cancellation of fifty (50) per cent. may be made.

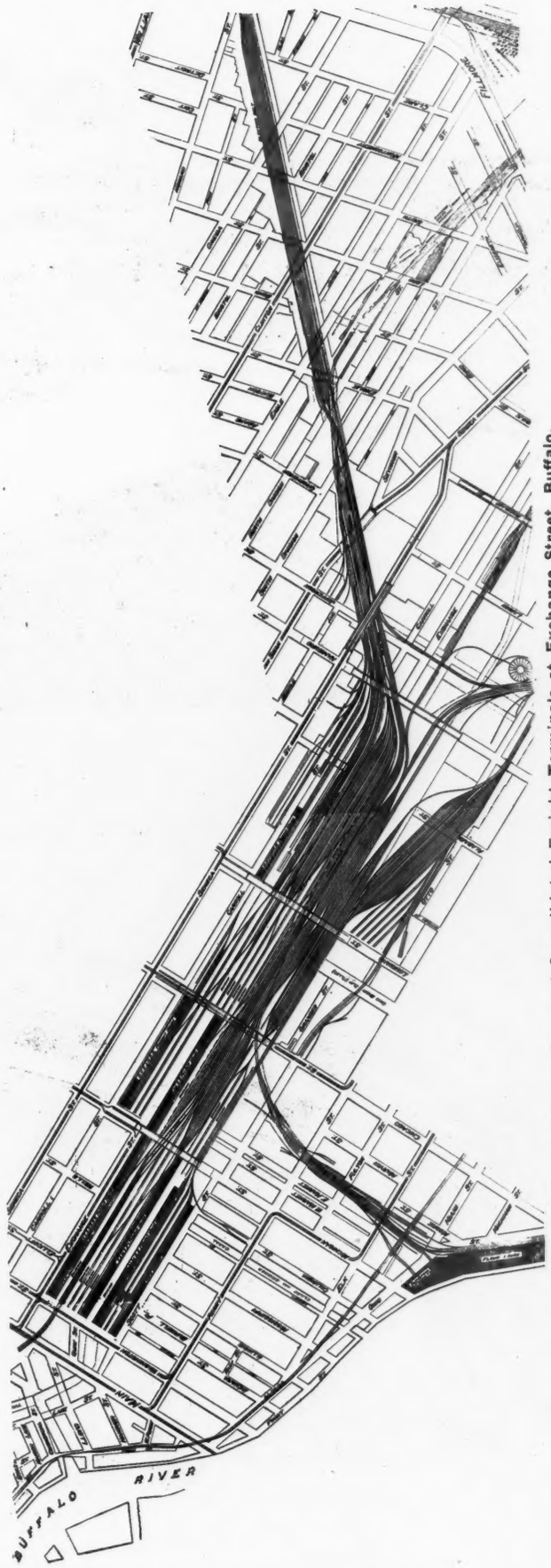
Proposed New Union Passenger Station at Buffalo.

For more than 20 years the city of Buffalo and the 13 railroads entering that city have been trying to agree on a plan for a Union passenger station and the consolidation of the local freight terminal facilities. Numerous commissions have been appointed by the Mayor and the merchants of Buffalo to consult with the railroads and to formulate plans for the consolidation of the freight and passenger terminals. No less than six different sites have been considered. Three years ago the city commission which was then serving recommended, with the approval of all of the railroads, a plan for a Union station at the foot of West Genessee street. A definite offer was made to the city by the railroads that they would unite in the construction of a Union station on this site provided the city would undertake the opening and changing of a number of streets and canals. This offer was not accepted and for a time the agitation rested. There were serious objections to this site from an operating standpoint, chiefly the lack of room for adequate future expansion, but as it seemed to have many advantages in location by reason of its being near the business center and the center of population the railroads agreed to accept the plan.

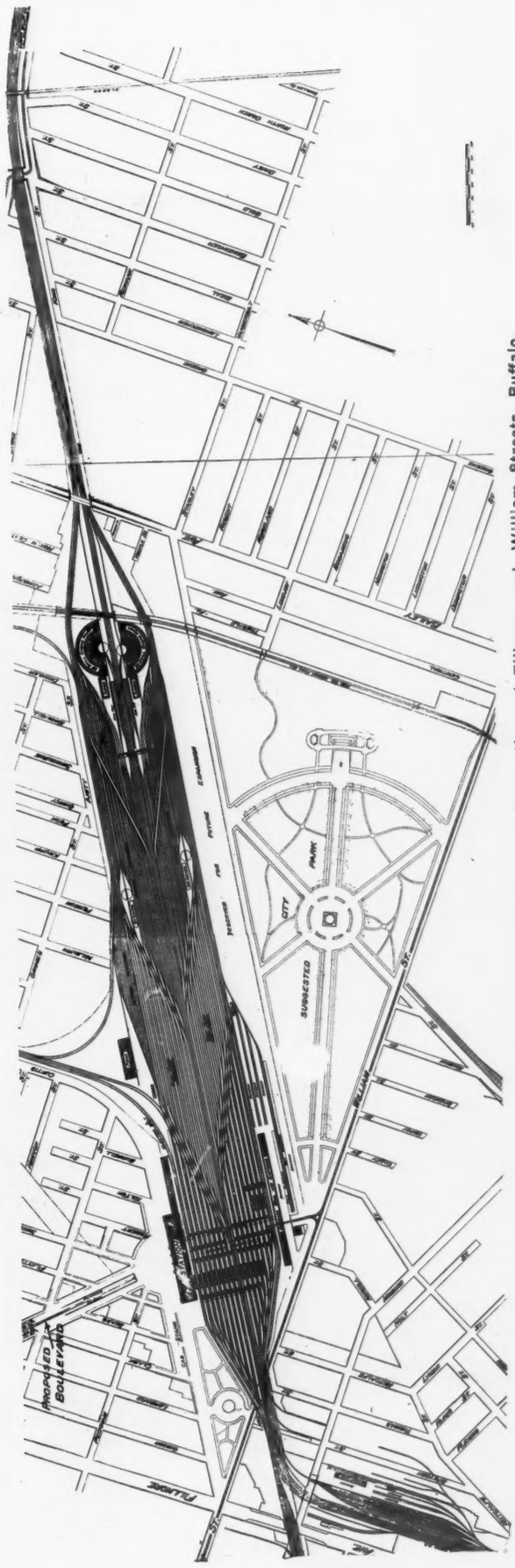
Many studies have been made for the location of a Union passenger station on what is known as the Exchange street site extending as far west as Main street and south to Perry street. This ground is at the present time occupied by the freight and passenger terminals of the New York Central lines and the Erie. The principal objections to this site, however, are: (1) The necessity of scattering the present local freight terminals to remote parts of the city; (2) lack of room for future expansion; (3) interference between freight and passenger traffic due to grade crossings, and the fact that such a station would require an arrangement of stub tracks. Other sites have been suggested at Lafayette square, Driving Park and Eagle street, but none of these meets any of the requirements.

After the failure to agree with the city on the terms under which the Genessee street site could be acquired, the municipal commission resigned in disgust and it was not until about a year ago that the present commission, consisting of Henry J. Pierce, Carl Machener and W. H. Gratwick, was appointed. The railroad companies appointed a committee consisting of W. J. Wilgus (New York Central), Samuel Rea (Pennsylvania Railroad), and J. M. Graham (Erie). On June 11, 1907, this joint committee submitted a report recommending the construction of a Union station on the so-called Fillmore site, and with the report presented a proposed plan for a Union passenger station at that point and for the consolidation of the local freight terminals at Exchange street on the ground now occupied by the passenger and freight stations of the New York Central Lines and the Erie. While these plans are little more than a preliminary study, they indicate the advantages to all concerned of the entire rearrangement of the passenger and freight facilities in Buffalo. The Fillmore site has long been considered by most of the railroads as the most advantageous location in the city, and even before the Genessee street site was agreed upon its adoption had been strongly urged. It covers a large tract of land now occupied by the East Buffalo freight and stock yards of the New York Central lying between William street and Bailey avenue. It is about 1½ miles long and contains 300 acres free from intersecting streets. The New York Central is now building a large new yard near Gardenville on the Terminal Railway of Buffalo, on the completion of which all of the East Buffalo facilities will be transferred there. The ground thus to be vacated will then be available for the Union passenger station. While a passenger station built here would be farther from the business center of the city than the present passenger station, it would be much more

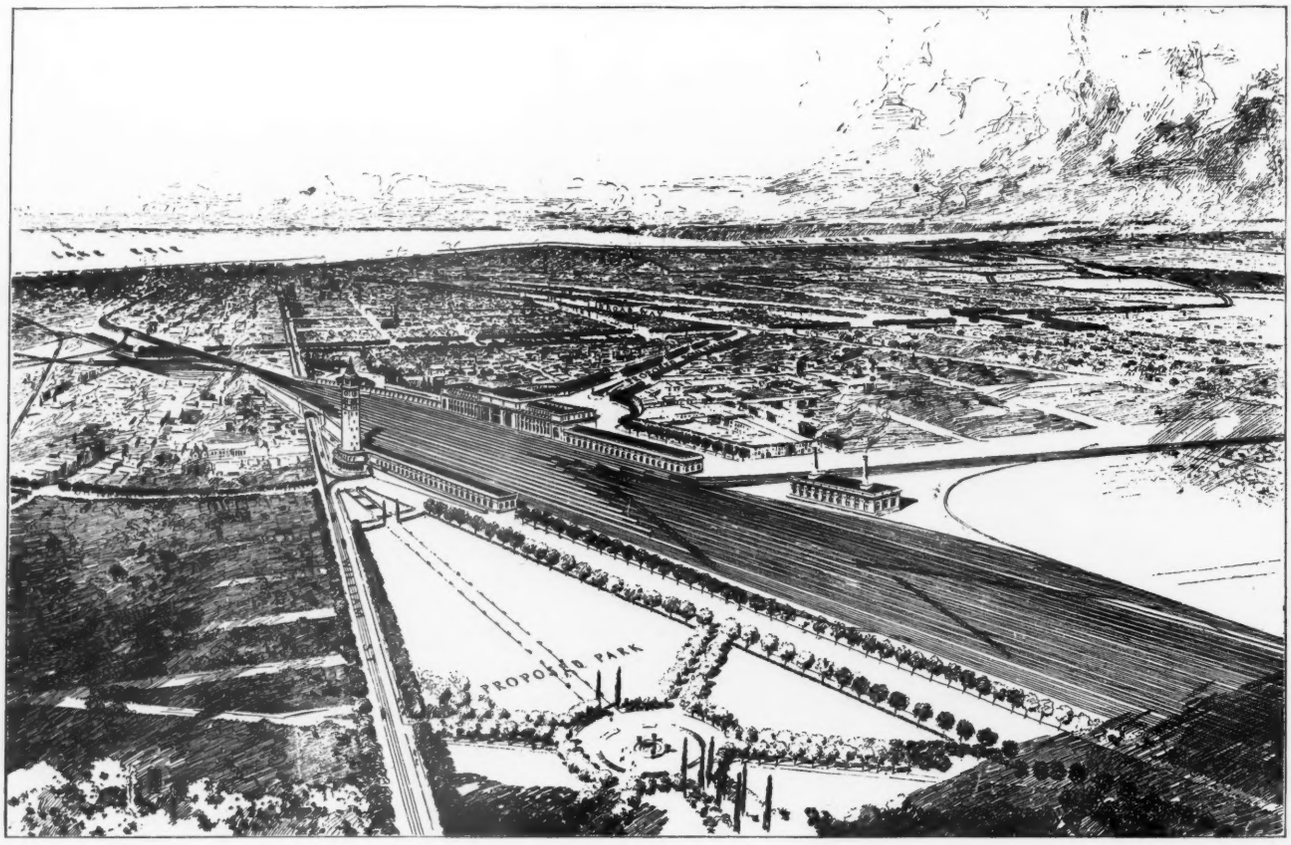
Key Map of Buffalo Showing Railroad Connections and Location of Proposed Union Passenger Station.



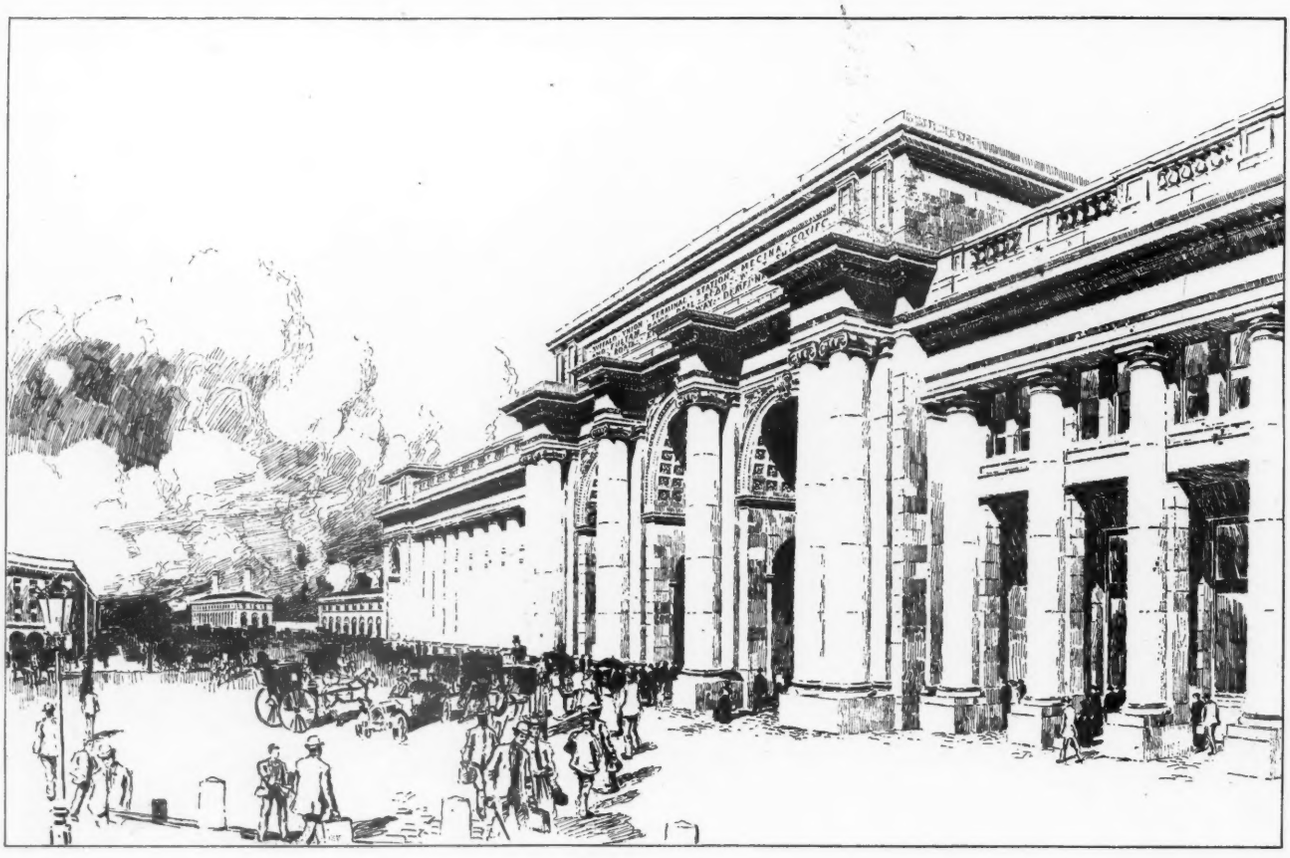
Plan of Proposed Consolidated Freight Terminals at Exchange Street, Buffalo.



Plan of Proposed Union Passenger Station and Connections at Fillmore and William Streets, Buffalo.



Perspective View of Proposed Union Station and Yard at Buffalo.



North Front of Proposed Union Station at Buffalo.

convenient to the largely growing population in the east, south and northern sections of the city. By widening William street and opening a new boulevard from the intersection of Broadway and Fillmore parkway to and under the passenger station to a connection with William street, two fine thoroughfares would be opened between the business section of the city and the new terminal. Fillmore parkway intersects all of the streets in the residential section west of Main street and would thus afford convenient communication with the new terminal without the necessity of passing through the congested business streets. A further scheme for making the station more accessible is the electrification of the present Belt Line, which could be used as a distributing loop for suburban trains of all of the railroads making local stops at the intersections with the principal streets. A large station could be built at the Terrace convenient to the business and residential sections, and at this station passengers could buy through tickets and check baggage before taking a belt line train to the Union station. Similar facilities could be provided at other important stations.

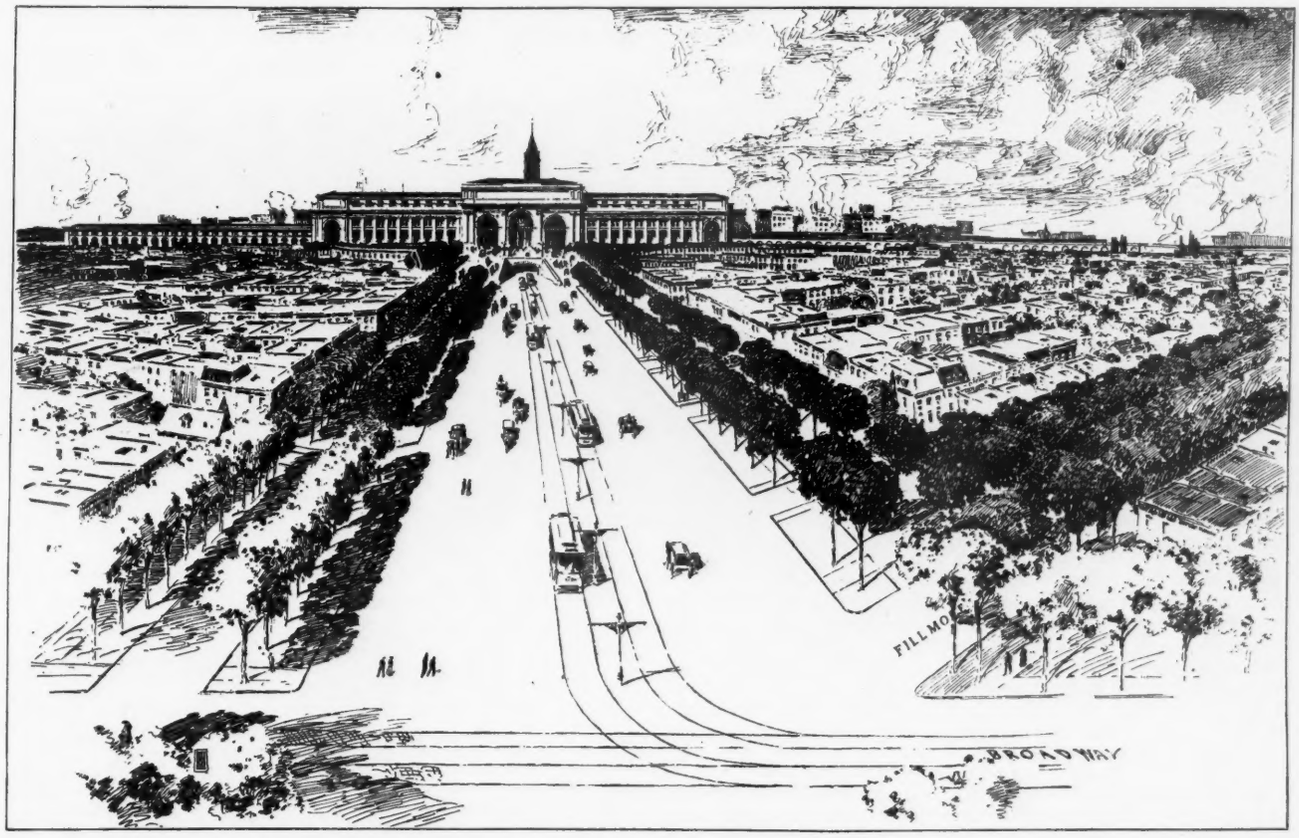
The street-car system could be easily adjusted to the conditions so that on the average no more time would be consumed in reaching the station from the residential sections than is now required to reach the present isolated stations. With the extension of the boulevards connecting the north and south park systems of the city, the new station would be placed among attractive surroundings. As will be seen from the plan, one of the important advantages to the city would be the dedication of a plot of ground containing more than 100 acres to the south of the station for a park which is much needed in this somewhat congested section.

From the railroad standpoint the most important advantage of the Fillmore site is the elasticity which it possesses for making future extensions to meet the growing needs of the city without any radical changes or reconstruction. Ample ground is available for adding future facilities which would take care of business for many years to come. Another point hardly less important is the fact that the station could be built without the least interference to traffic on any of the roads. The ground would be available for building even before all of the present yards are transferred to Gardenville, and the entire station and yards could be completed without interfering in any way with the present passenger or freight terminals of any of the roads. When completed and occupied the present terminals could be abandoned and the reconstruction and consolidation of the freight stations begun.

The adoption of this site for a Union passenger station will permit the centralization of the local freight terminals of all the railroads near the business center of the city on an area of approximately 100 acres, bounded by Exchange, Washington, Scott and Hamburg streets. Buffalo would then have local freight terminals which, for convenience of location to wholesale and retail merchants and manufacturers and efficient operating features, would not be equalled in any other city in the country. The business streets connecting with the freight houses and team tracks lead to the shipping districts without any steep grades or grade crossings of railroad tracks. A great saving of time and money to shippers would be made possible by this consolidation, as mixed shipments for various lines could be delivered with a minimum loss of time.

In connection with the freight houses and team tracks the studies show large storage yards with independent switching leads and an absence of interruption of operation by passenger trains together with direct connections to the main outlying yards of the several railroads.

The accompanying maps and sketches of the proposed passenger station show the general features of the scheme as proposed. While they are, of course, tentative, they are the result of a careful study of all of the conditions, and it is believed that the many details of freight and passenger connections in and out are entirely possible of solution without difficulty. The plan has been submitted to all of the railroads concerned and to the Mayor of Buffalo, and has so far met with no serious objections. It is to be submitted for approval to the city council of Buffalo before any arrangements are made for the organization of a terminal railroad company to build and operate the freight and passenger stations. It is believed that the plan will be approved by all concerned, and that in the near future active work will be begun on the project. The plans are presented here more as an interesting study of difficult conditions than as a definite solution of the problem.



Approach to Proposed Union Station from Broadway and Fillmore Parkway.

Dry Battery for Block Signal Wires.*

In 1905 we placed 16 dry cells on the block wire at each of two stations, Brookfield and Waukesha. On account of earth currents at Waukesha we used one of our other telegraph wires for a return, arranging the keys at both stations with front and back contacts, removing the circuit closers, and arranging the circuit to close on the back stop without the battery and on the front with the battery, in a manner well known to you all. This circuit, including two 50-

*A paper by U. J. Fry (C., M. & St. P.) read at the annual meeting of the Railway Telegraph Superintendents.

ohm sounders, measured 271 ohms. Each cell, when put in service, measured 1.5 volts and .125 ohms internal resistance. At Brookfield we set the battery on a shelf which had been used for gravity battery and left in a somewhat unclean condition. At the expiration of 23 months each cell measured 1.31 volts and 2 ohms internal resistance. At Waukesha we placed the battery far back on a new and clean shelf in the telegraph table, with a closed door. After 23 months each of these cells measured 1.38 volts and .68 ohms internal resistance. We are inclined to attribute the difference in condition of these cells to the condition of the shelves on which they were placed, because the service performed by each has been about the same. We estimate each system of cells has been used approximately 120 times a day, 3,600 times a month, and, if continued, this would amount to 43,200 times a year. We also estimate the keys were closed 3,360 times a day, making dots and dashes necessary to form letters and figures, which, for one month, would amount to 100,800 times, 1,209,600 times a year, or 2,419,200 times in two years. From the way this circuit works now we know it will continue to work two years, and, perhaps, longer. Taking these two systems together we had, to begin with, 32 cells and 48 volts. At the end of 23 months we had 20.96 and 22.08 volts, respectively, or 43.04 volts, a loss of, approximately, 5 volts. The 32 cells cost $5.12.

To secure the same voltage with gravity battery would have required 48 cells at an initial cost of 42 cents per cell, or $20.16, to which we add the expense for maintenance at $1 per cell per year, making a total of $68.16 for one year, and $116.16 for two years.

For each additional two years the expense for maintenance would be $5.12 and $96, respectively, for dry and gravity cells.

At present about two gravity cells per mile are used on block wires on many of the Western and some of the Eastern roads. Many of the block stations are closed during the night, and the arrangement of the dry cells to provide for the extended sections at night will, we assume, take double the number of dry cells, or four per mile, to accomplish the same results.

Assuming the life of the dry cells properly installed and maintained to be two years, we will estimate the maintenance only on a 100-mile block wire circuit for a period of 10 years, as follows:

One hundred miles, at 2 cells per mile gravity, would require 200 cells. To secure the same voltage we should need 133 dry cells, but on account of the longer sections at night 266 dry cells would be necessary.

For a term of 10 years each gravity cell would cost $10, while the dry cell only 80 cents, or comparatively,

Gravity	$2,000.00
Dry	212.80

I would not recommend cutting down the number of dry cells to the same voltage, but would recommend using twice as many dry cells as you would use of gravity, and thus secure 50 per cent. more current to start with, and sufficient to hold up the service near the end of each two years. I estimate the total expense as follows:

200 gravity cells, 10 years	$2,000.00
2,000 dry cells, 10 years	320.00
A saving of	$1,680.00

This would make a saving of $168 per year, or $1.68 per mile per annum.

In addition to this we do not need battery cupboard space in our stations, and are free from the accumulation of dirt, etc., accompanying gravity battery, and save the services of the lineman at each battery station four times a year, which is now an expense of about $10 per battery station per year.

We are about to equip two block wire circuits, one 285 miles and the other 125 miles long, with the dry batteries. A special key and a two-lever three-point switch have been designed to take the place of the old standard telegraph key and one-lever two-point switch, for the purpose of preserving in a block wire all the good features. While we eliminate the only objection to the present arrangement, namely, the operator at one station is unable to extend the circuit between the stations on each side of him without cutting his entire set out. This will prevent the signals passing any office and overcome the danger of operators making mistakes which are liable now when the circuit is cut through as above referred to.

In addition to using dry battery for our block wires, I shall submit a proposition to the telegraph company before long for the use of dry cells on our short branch lines, where there are only two or three offices, and where but a small amount of business is transacted. We are also using the dry cell exclusively in connection with our private line telephone systems, and use it in connection with our synchronizing self-winding clocks; also in our office bell and buzzer service; in fact, we use the dry cell wherever we can, to the exclusion of all others.

Beet Sugar Production.

The following statistics of beet sugar production are taken from a recent report to the Department of Agriculture:

By States, for 1906.

State and year.	Factories in operation.	Area harvested, acres.	Average yield of beets, per acre, short tons.	Beets worked, short tons.	Sugar manufactured. Pounds.	Sugar manufactured. Tons of 2,000 lbs.	Estimated average extraction of sugar, per cent.	Average: Sugar in beets, per cent.	Average: Purity coefficient of beets.	Average: Length of campaign, days.
California	8	60,141	11.17	671,571	185,480,000	92,740	13.81	16.7	82.7	115
Colorado	15	110,943	13.41	1,487,383	334,386,000	167,193	11.24	14.7	80.3	132
Idaho	4	19,950	11.48	229,023	56,798,000	28,399	12.40	16.9	86.8	95
Michigan	16	93,984	8.57	805,309	177,214,000	88,607	11.00	14.5	83.2	85
Nebraska	2	13,650	9.77	133,387	30,754,000	15,377	11.53	13.7	80.6	136
Utah	5	24,108	15.88	382,769	80,848,000	40,424	10.56	14.5	81.8	123
Wisconsin	4	15,560	10.19	158,600	35,220,000	17,610	11.10	13.6	83.0	83
States with but 1 factory: Arizona, Illinois, Kansas, Minnesota, Montana, New York, Ohio, Oregon, Washington	9	37,738	9.75	368,070	66,524,000	33,262	9.04	14.4	81.2	86
Total and average	63	376,074	11.26	4,236,112	967,224,000	483,612	11.42	14.9	82.2	105

Totals and Averages by Years, for 1901 to 1905.

1905	52	307,364	8.67	2,665,913	625,841,228	312,921	11.74	15.3	83.0	77
1904	48	197,784	10.47	2,071,539	484,226,430	242,113	11.69	15.3	83.1	78
1903	49	242,576	8.56	2,076,494	481,209,087	240,604	11.59	15.1	...	75
1902	41	216,400	8.76	1,895,812	436,811,685	218,406	11.52	14.6	83.3	94
1901	36	175,083	9.63	1,685,689	369,211,733	184,606	10.95	14.8	82.2	88
Averages, 1901-1905	..	227,841	9.13	2,079,089	479,460,033	239,730	11.53	15.0	82.3	82

The total sugar production of the world is given as follows:

Country.—Cane sugar.	1902-3. Tons.*	1903-4. Tons.*	1904-5. Tons.*	1905-6. Tons.*	1906-7. Tons.*
United States:					
Louisiana and Texas.	329,226	234,800	350,000	342,000	243,000
Hawaii	391,062	328,103	380,576	383,225	390,000
Porto Rico.	85,000	130,000	145,000	213,000	255,000
Total, U. S.†	805,288	692,903	875,576	938,225	888,000
Cuba	998,878	1,040,228	1,163,258	1,178,749	1,250,000
Other West Indies	260,163	268,306	244,837	300,618	291,000
Mexico	112,679	107,547	107,038	107,529	115,000
Central America	21,500	21,450	19,768	18,516	19,000
South America	579,022	601,134	590,382	700,001	654,000
Total, America	2,777,530	2,731,568	3,000,859	3,243,638	3,217,000
Asia	2,839,596	2,841,547	3,284,775	2,861,819	3,385,446
Africa	277,473	321,706	232,101	283,364	295,000
Oceania	133,126	163,328	216,213	230,000	249,000
Europe	28,000	28,000	18,592	14,512	15,000
Total cane-sugar	6,055,725	6,086,149	6,752,540	6,633,333	7,161,446
Beet sugar.					
United States	195,463	208,135	209,722	283,717	‡433,010
Canada	6,696	6,710	8,034	11,419	11,367
Total America	202,159	214,845	217,756	295,136	444,377
Europe:					
Germany	1,762,461	1,927,681	1,598,164	2,415,136	2,250,000
Austria-Hungary	1,057,692	1,167,959	889,373	1,509,879	1,335,000
France	833,210	804,308	622,422	1,089,084	755,000
Russia	1,256,311	1,206,907	953,626	968,000	1,450,000
Belgium	224,090	209,811	176,466	328,770	280,000
Netherlands	102,411	123,551	136,551	207,189	190,000
Other countries	325,082	441,116	332,098	415,000	440,000
Total Europe	5,561,257	5,881,333	4,708,700	6,933,649	6,700,000
Total beet sugar	5,763,416	6,096,178	4,926,456	7,228,785	7,144,377
Total production	11,819,141	12,182,327	11,678,996	13,862,118	14,305,823

*In long tons of 2,240 lbs., except in the case of European beet sugar production, which has been returned in metric tons of 2,204.622 lbs., or originally estimated by Licht. Other data are mainly from Willett & Gray, but in the case of British India official estimates of production have been substituted.

†Not including the Philippine Islands, which are included under Asia.

‡Equal to 484,971 short tons, or 1,350 tons greater than the production shown in table on page 104.

GENERAL NEWS SECTION

NOTES.

The Baltimore & Ohio has begun suit in Fayette county, Pennsylvania, to contest the constitutionality of the law of that state limiting passenger fares to 2 cents a mile.

The members of the Western Passenger Association have voted to make no more contracts for special trains for picnic parties—a decision which probably has a string to it.

By the People's Line of steamers between New York and Albany the one-way fare is now $2 instead of $1.50, as in former years. The round-trip fare has been advanced to $3.50.

The Governor of New Jersey has signed a bill, passed by the legislature last winter, regulating demurrage on freight cars. The law requires railroads to give consignees three days' free time for unloading.

Press despatches one day last week reported malicious tampering with automatic block signals on two roads, the Philadelphia & Reading and the Atchison, Topeka & Santa Fe. In both cases trains were repeatedly stopped without cause.

Eight Colorado railroads have filed quo warranto proceedings in the district court at Denver against the Railway Commission and the State Treasurer, demanding that the commission be ousted from office and the law declared unconstitutional.

In a fire at Southwick, Mass., July 1, at the ice station of the New York, New Haven & Hartford, 40 freight cars were burned up, together with icehouses and machinery, involving a loss, including that on 75,000 tons of ice, aggregating $200,000.

A press despatch from Little Rock says that certain suits filed by Prosecuting Attorney Rhoton against the St. Louis, Iron Mountain & Southern for issuing mileage books to members of the 1905 legislature have been compromised by the railroad company agreeing to pay $12,500.

The new State Railroad Commission of New Jersey already has before it 17 complaints against the railroads. These are to be investigated as soon as inspectors are appointed. The members of the commission are J. W. Congdon, of Paterson (President); B. D. Dudley, of Orange, and E. Wilson, of Red Bank.

On Saturday, June 29, the new turbine steamship "Yale," of the Eastern Steamship Co., made the trip from New York to Boston in 12 hours 16 minutes, or at an average speed of 21¼ knots per hour. It is said that the best run ever before made between New York and Boston took 15 hours. The tide was against the "Yale" all the way.

On July 1 the New York Central made advances of about 10 per cent. in season-ticket rates between New York and Mount Vernon, White Plains and other stations on the Harlem division. Between Yonkers and 155th street, on the Putnam division, the single-trip rate has been reduced from 25 cents to 15, and the round trip from 40 cents to 25.

The Attorney-General of Missouri has requested the railroads of the state to cancel state passes now in the hands of persons other than railroad employees, so that the three-months' test of the two-cent law recently begun may be a fair one. Attorney-General Hadley says that if these passes continue in force no true estimate of the workings of the two-cent law can be made. There is no anti-pass law in Missouri.

The Trunk lines have issued a revised freight classification, to take effect August 1, in which a large number of items, said to be two-thirds, have been changed, many of them in such a way as to increase the freight rate. In a column article printed in a New York daily paper, designed to show that the increases are material, we find, however, hardly any evidence of important increases, except that the minimum weight for carloads is, in some cases, increased.

Reduced Passenger Fares.

Two-cent fares were adopted on all the principal railroads of Illinois, July 1, in accordance with the law of that state. The newspapers say that the railroads have decided not only to refrain from contesting the law until after some months' trial, but that they also intend soon to reduce interstate rates to a level with the rates prescribed by state laws. In Illinois passengers paying cash on trains, when they might have bought tickets, may still be charged 3 cents a mile. The order of the Virginia State Corporation Commission to sell tickets at 2 cents a mile has not been obeyed by the principal railroads of that state. A despatch from Norfolk says that the Norfolk & Western, the Chesapeake & Ohio and the Atlantic Coast Line began, July 1, selling tickets with a coupon attached, entitling the buyer to a rebate in case the price charged for the ticket should be finally decided unlawful.

The Engineers' and Constructors' Club.

This society, limited in membership to the engineers composing the organization of Dodge & Day, has been formed in Philadelphia to discuss subjects relating to engineering and construction, and to give all members the benefit of the experience gained by each in his particular line of work. Four meetings have been held and papers have been presented on Civil Engineering Preliminaries for an Interurban Trolley, by Charles Reed Marsh; Electric Welding, by J. H. Gravel; Gas Producers and Internal Combustion Engines, by John E. Zimmermann, and on Concrete Piling, by Julian C. Smith. The proceedings of the club, giving the papers presented and the discussions, will be published regularly.

The Summer Season in Sioux City.

Sioux City, June 25.—Four railroads were rendered inoperative to-day when several thousand honey bees swarmed on the handle of an important switch in the terminal yards. A train of cars lay across the yards and obstructed traffic, but none of the two score of idle trainmen dared approach the switch. Aid came through a small boy, who declared that his father could capture bees. He was hailed as a saviour and despatched for his father. The latter showed up in half an hour and calmly loaded the bees into a wash boiler, and the wheels of commerce again revolved.—*Press Despatch.*

Two Ways of "Moving" Freight.

The freight agents of the Southern Pacific in California and Oregon have been rousing consignees to unload freight cars more promptly and figures have been published showing the degree of success attending their efforts. At Portland, April 1, the number of cars on hand waiting to be unloaded was 674; and on May 1, 823, but on June 11 this number was reduced to 216. At San Francisco the number of cars April 1 was 1,860; on May 1, 2,358, and on June 12, 1,640. At Sacramento and Los Angeles the number on June 12 was a little larger than on the 1st of May.

The foregoing was issued by a press bureau connected with the railroad. Another item on a cognate subject comes in the press despatches of June 20, and gives the interesting information that consignees in San Francisco who have wanted their cars badly enough to pay $50 each for having them expedited, have had no difficulty in getting prompt delivery. According to this despatch a former employee of the Southern Pacific, named Manvais, on payment of the sum named, telegraphed to Sparks, a division terminus in Nevada, and by dividing his fees with somebody at that point got the desired cars switched out and sent forward. The report says that Manvais did such an extensive business that he had to hire a secretary.

A Sane Gubernatorial Candidate.

Henry M. Whitney, outcast by Mr. Roosevelt, is a possible Democratic nominee for the governorship of Massachusetts. A part of a public speech of his on June 22 is as follows:

"The policy that has controlled the management of the railroads of the country, both east and west, has been a policy that has inured to the benefits of shippers of freight everywhere. And these shippers of freight who reside furthest from the centers of trade have received the greatest proportional benefit from it. Any change of policy brought about by government control or government ownership would, in my judgment, seriously menace all New England industries.

"I believe that it is everywhere admitted that the consolidation of the railroads has been productive of general benefit to the public. It happens that there is now under discussion a consolidation of railroad interests in New England, the largest and most important of any that have ever taken place in New England. * * *

"If we can safely be guided by the light of experience, there is no reason for distrusting the effect of this proposed consolidation upon the interests of the people of Massachusetts. I speak in this matter wholly as a citizen of Massachusetts. I have said that I had no part or lot in the arrangements for the exchange of stock. Had

I been consulted about it I should have advised the parties in interest to go about it in a more open manner. I think it was a tactical mistake in not having so proceeded.

"But the real question is, after all, whether this consolidation is or is not for the benefit of the people. I believed that the consensus on the part of the business men generally throughout the state would be well-nigh unanimous in its favor."

Censoring Railroad Messages.

The telephone service as well as the telegraph needs constant censoring, for the double reason that the telephone equipment is more expensive, and more easily accessible to those to whom "talk is cheap." The telegraph censor will probably find that the best means of checking telephone use is to have a record kept of stations or lines that are often reported busy, and get after the persons who use those lines and cut short their talk.—*F. E. Bentley, Terminal R. R. Association, St. Louis.*

Railroad Consolidation in Argentina.

Negotiations are being made for a consolidation of the Buenos Ayres & Pacific and the Argentine Great Western, together with the Argentine Transandine, which is under construction. If such a merger is carried out the resultant company will control a line from Buenos Ayres across Argentina to a connection with Chilean railroads, which will bring it to Valparaiso on the Pacific coast. The Buenos Ayres & Pacific runs from Buenos Ayres to Villa Mercedes, about 400 miles, where it connects with the Argentine Great Western. The latter goes as far as Mandoza, 200 miles west of Villa Mercedes. The Transandine is building from Mandoza across the Andes, and most of the work has been finished, the most important still undone being several miles of tunnels. The Argentine Great Western a short time ago arranged to operate the Transandine, and the Buenos Ayres & Pacific and the Argentine Great Western have jointly guaranteed the interest on the Transandine bonds. The plan for the merger of the companies is as follows:

The Buenos Ayres & Pacific is to take over both the other companies and agree to pay the Argentine Great Western interest charges, 6 per cent. dividends on the Argentine Great Western preferred stock and additional distributions on a rising scale in proportion to the dividends paid on Buenos Ayres & Pacific common stock. The Argentine Great Western common stock will rank with the Buenos Ayres & Pacific second preferred; it will receive 6 per cent. dividends and will also share with the Argentine Great Western preferred in receiving additional payments. The Buenos Ayres & Pacific has £6,950,000 ($34,750,000) debenture stock, £1,200,000 ($6,000,000) 5 per cent. cumulative first preferred, £1,000,000 ($5,000,000) 5 per cent. non-cumulative second preferred, and £6,000,000 ($30,000,000) common stock. The company also guarantees dividends on £5,059,718 ($25,298,590) stock of subsidiary companies. The Argentine Great Western has £3,975,517 ($19,877,585) debenture stock, £1,312,500 ($6,562,500) preferred, and £2,937,500 ($14,687,500) common stock.

Cigarettes Worse Than Whisky.

In April last the Pittsburgh Railways Company of Pittsburg, operating 490 miles of track and 1,800 cars, issued a notice to employees that for the betterment of the service and the safety of the public, it would thenceforth be the policy of the company to not retain in its employ men who use intoxicating liquors or cigarettes or are in the habit of gambling. Concerning this notice General Superintendent John Murphy, writing to the *Sunday School Times*, says:

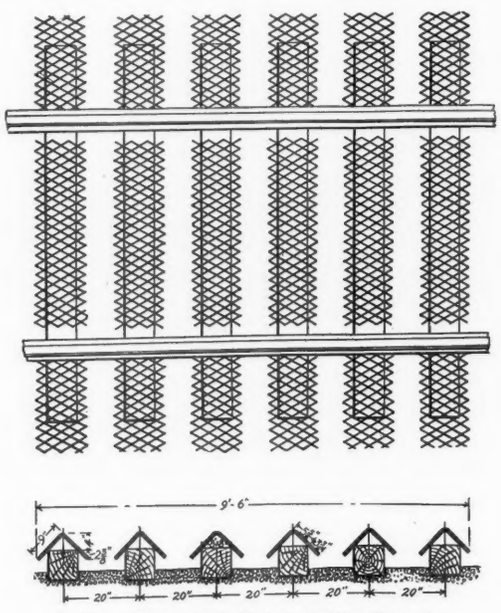
Being an officer of a company that carries over two hundred and twenty-five million passengers yearly, it becomes my moral and legal as well as my public duty to use all reasonable means to protect the lives and further the comfort of this large number of passengers. Having for some time back noticed that our accidents were increasing, upon investigating the cause I satisfied myself that the standard of our men who did not use liquor or tobacco (the latter in the form of cigarettes) was much above that of those who used either. I therefore deemed it my duty to abate the evil so far as lay in my power to do so, and tried to uproot it and cast it out through discipline, but found this method inadequate and ineffectual. I then went further, and concluded the desired end could be attained only by removing from the service or refraining from employing all men addicted to the objectionable habits alluded to.

It is my aim and intention to pursue this policy without abatement, since I have by it proved beyond all doubt that it has raised the standard of our men. I have been criticized for the stringency of the order, especially the prohibition of the use of cigarettes; but on the other hand I have the assurance of our division superintendents (of which we have 12), aided by my own observations, that persons addicted to the use of cigarettes, especially young men, are the most careless in their duties and less able to perform them than men using liquor in moderation. I may also mention that in 17 years' experience as manager of public utility corporations I have had occasion to promote many of our men from the rank of conductors and motormen to officers, and in no case has a man using whisky come up to the requirements.

An Expanded Metal Cattle Guard.

An expanded metal cattle guard has been designed by F. W. Stewart, General Manager of the Climax Stock Guard Co., Chicago. It is made in sections 2 ft. long and 18 in. wide, bent to a trough shape, each side thus being 9 in. wide and 24 in. long. These sections are set one over each tie, extending 4 in. above and 2⅜ in. below the top. The ballast between ties is removed to a depth of about 6 in., making it even more difficult to cross the guard. When cattle attempt to cross their feet go into these shallow pits, and the projections from the expanded metal, striking their legs in a tender part, make it painful to proceed. The guard, however, does not prevent them from withdrawing their feet. The mesh of the expanded metal may be made any size desired.

The tie spacing may be anything desired, that in the drawing being 20 in.; also any number of ties may be covered. Track work and tie inspecting may be done without removing the guard. Each



A New Expanded Metal Cattle Guard.

section is fastened in place with from eight to 15 staples. If a section should be crushed or mashed out of shape it may be restored and again put in service with little expense or trouble. It is cheap in first cost and if galvanized or properly painted, will last a long time. These guards have had numerous tests with satisfactory results. They are light and are shipped in bundles, so that they occupy little space, and the freight rate on them is low.

Fire Test of a Concrete-Block Building.

A fire test of a concrete-block business building, by actual conflagration, occurred at Nashville, Tenn., a short time ago. It was the five-story Montgomery building, built of two-piece concrete blocks by the Granitoid Construction Co., of Nashville, the blocks being made under the American hydraulic system. According to the report, at one time during the fire the upper walls of the building as well as the concrete ornamental cornice and top courses, were almost at a white heat, appearing to be transparent, but notwithstanding the great volumes of water poured on them while in this condition, little or no damage resulted, except for a few chips in the sills of the windows and the blocks adjacent to such openings. The walls remained intact. This was an excellent demonstration of the fire-resisting qualities of concrete blocks made of the materials used in the construction of this building, namely, crushed limestone, granite screenings and Portland cement. The building was stocked with highly inflammable material, being occupied as warerooms by a firm of furniture dealers. The building was valued at $35,000, but the damage was estimated at not over $8,000.

The walls of the building are 16 in. thick, with a 50 per cent. air space, except the top story, which is 12 in. thick, with a 40 per cent. air space. The headquarters of The American Hydraulic Stone Co., under whose system the blocks were made, are at Denver, Colo.

Abyssinian Railroad Fails.

The Abyssinian Railroad, being unable to pay dividends, has applied for liquidation. M. Klobukowsky, a Frenchman, has been appointed receiver and will conduct the negotiations for carrying out the construction of the extension of the line to Adis Abeba, the capital of Abyssinia.

The Abyssinian Railroad runs from the port of Djibutil, French Somaliland, to Dire Dawa, about forty miles from Harar, in Southeast Abyssinia, a distance of about 186 miles.

It was opened for traffic December 26, 1902. The total receipts in 1904 amounted to about $262,000, and the total expenses, including financial charges, to about $542,000, leaving a deficit of about $280,000. The line had the effect of diverting to Djibutil the Abyssinian trade which used to pass through the port of Zaila, British Somaliland. Last year France, Great Britain and Italy negotiated a joint treaty with Abyssinia, the main features of which are a guarantee of the integrity of the Abyssinian empire, the open door, commercial equality for all countries and the continuation of the construction, under French auspices, of the railroad from Dire Dawa to Adis Abeba, Great Britain and Italy naming representatives on the railroad directorate. King Menelik, in agreeing to the international control of the railroad, made the reservation that it should in no way limit his sovereign rights.—*New York Tribune.*

"Put Knocks in the Box."

This, according to the Chicago reporters, is what the Burlington road has invited its passengers to do. A locked box, with an opening in the lid, is fixed in the observation cars on trains 47 and 48 between Chicago and St. Paul, and passengers are invited to drop into the box any suggestions they may have to offer concerning the quality of service on the trains. One swallow does not make a summer, but one complaint box appears to have been sufficient, in this case, to lead the industrious reporters to herald this new "enterprise" of the Burlington as having been put in vogue throughout the company's lines. If, now, this enthusiastic passenger department would invite growlers to growl into a box, or something of the sort, at all the small stations and on the non-luxurious trains, and would publish the results, some interesting reading might be brought out.

Service on Public Commissions.

Legislated out of existence, the New York Rapid Transit Commission will pass into our municipal history as one of the most remarkable civic bodies ever created with a special end in view. It has been a fine example of public service. Many of our best citizens, on this Commission, have been willing to give unstintingly of their time and talents in order to help on the progress of New York. Governor Hughes has had difficulty in securing the type of men he desired to appoint to the new commission. The salary of the position is ample; but the labor that will have to be faced is great. Very much—perhaps too much—will be expected of the new Commission. This is why some whom the Governor sought to induce to serve have declined. They are not afraid of work, but they do not like to undertake impossible tasks; and they think that the public is now in a mood to demand impossibilities. * * * More than this, a salary of $15,000 does not now look so tempting as it did when its purchasing power was greater. Then, too, in order to earn it, a great deal of hard and confining work will have to be done. This prospect might well deter a man not in robust health, as it surely would a lover of ease, but even this is not the greatest difficulty. Competent men, otherwise willing, dread the criticism and unfair attack which, they say, more and more befall those who try to work for the public. Criticism of men on public commissions of all sorts is more constant and searching than it used to be. This is due, not so much to the development of a carping temper in people, as to the increased facilities for making and distributing comment, forming and echoing judgment. The complaint of one aggrieved citizen is now caught up in the press and talked about by thousands, in a way once wholly impossible. But to have his best work found fault with, his real achievements minimized, and his failures magnified, is what any man must look forward to who consents to serve on a Rapid Transit Commission, a Board of Education, or a Public Service Commission. But what of it? It should all be taken as simply a part of the day's work.—*Evening Post*, New York.

More Safety Appliance Law Violations.

Attorney-General Bonaparte has brought suits against 32 railroads to recover penalties for violation of the safety appliance law. These prosecutions are based on information reported by the safety appliance inspectors of the Interstate Commerce Commission. The roads made defendants are as follows: Alabama Great Southern; Baltimore & Ohio (10 violations); Chicago & Eastern Illinois; Chicago Great Western (12 violations); Chicago, Rock Island & Pacific (21 violations); Big Four; Chesapeake & Ohio; Covington & Cincinnati Elevated Railroad & Transfer & Bridge Company; El Paso & Southwestern; Erie; Galveston, Harrisburg & San Antonio; Georgia Railroad; Great Northern; Illinois Central (16 violations); Kansas City Southern (18 violations); Louisville & Jacksonville Bridge Company; Nashville, Chattanooga & St. Louis; Pacific Coast Railway (25 violations); Pennsylvania Railroad; Philadelphia & Reading; Mobile & Ohio; New York, New Haven & Hartford; Northern Pacific; St. Louis & San Francisco; St. Louis, Iron Mountain & Southern; Southern; Terminal Railroad Association of St. Louis; Texas & Pacific; Wabash; Washington & Columbia River; Yazoo & Mississippi Valley. About two months ago similar suits were brought against 25 railroad companies for similar violations.

INTERSTATE COMMERCE COMMISSION RULINGS.

Privileges in Transit Must be Published to be Effective.

In an opinion by Commissioner Clements the Commission has dismissed the complaint of R. R. Shiel & Co. against the Illinois Central and others, holding that the privilege of stopping in transit hogs shipped from western points to the East in order that they may be sorted and reconsigned under the through rate from point of origin cannot be enforced against carriers in favor of any single place or shipper in the absence of lawfully established tariffs making such privilege open to the public at large. To whatever extent long previous existence of lower rates in actual use may justify a presumption that they are sufficiently high, the mere publication of such rates, under which there has been no appreciable movement of traffic, is not conclusive proof that they are reasonably remunerative to the carriers. All privileges accorded on shipments in transit which affect the value of the service performed must be published in the tariffs, and reparation based on breach of contract for a privilege which was not mentioned in the tariffs must be denied the shipper because its allowance without publication was in violation of law. The facts bearing on the question of the reasonableness of the rates at issue have not been sufficiently developed to afford a proper basis for satisfactorily determining that question.

Coal Rates to Dallas, Tex.; Principle of Rate Comparison.

The Interstate Commerce Commission has announced decision in the case of Dallas Freight Bureau vs. Gulf, Colorado & Santa Fe and others (opinion by Commissioner Harlan). Rates to Dallas, Tex., from certain mines on the carriers' lines in Indian Territory and southern Arkansas have lately been increased from $1.25 to $1.50 a ton on slack coal and from $1.85 to $2.10 a ton on mine-run coal. On complaint that the present rates on such coal are unreasonable and request that the lower rates be restored, the Commission decides that following former decisions of the Commission on the reasonableness of coal rates of these carriers in adjacent territory, the rates from the mines that now take the $2.10 and $1.50 rates to Dallas should not for the future exceed $1.90 on mine-run and lump and $1.40 on slack coal. For the mines that now take rates of $1.85 and $1.25 to Dallas there should be some corresponding reduction, but as to these mines no order is now made.

The Commission further says that while the revenue per ton-mile over other routes on other lines and to other destinations is often suggestive in arriving at a proper estimate of the reasonableness of a rate over a route complained of, it is by no means conclusive. Varying conditions existing on different lines must of necessity justify differences in rates for hauls of the same distance. The real question in any complaint is between the particular points in question. In testing such a rate the rates on the same or adjacent lines in the immediate territory where the same conditions exist are of much greater significance and afford a much more accurate basis.

Classification of Different Kinds of Brick; Principle of Classification.

In an opinion by Commissioner Lane, the Commission has announced decision in the case of the Stowe-Fuller Co. against the Pennsylvania Company, Pennsylvania Railroad, and the Baltimore & Ohio. The complaint in this case was directed solely against present differences in the carriers' rates on fire, building and paving brick from Empire, Strasburg, and other points in Ohio to New York City and other eastern destinations, but no attack was made on the reasonableness of the rates on either kind of brick except as involved in the claim that any difference in the rates for the different kinds is unlawful. The Commission holds that no such distinction between these three classes of brick, which are made of the same material, come out of the same kiln, are nearly alike in color, and are of the same size and weight, exists as justifies a difference in rates. To hold otherwise would be to promote false billing by

the shippers and to require carriers to make an almost impossible examination of the use to which each shipment of these brick was put. The Commission further says that classification must be based upon a real distinction from a transportation standpoint. Aside from the difficulty in learning what use the brick were to be put to, the Commission cannot regard a classification as scientific, or a difference in rates as well based, which is altogether founded upon a distinction that has no transportation significance. Such a differentiation, if permitted and extended throughout the various classes of freight, would lead to an almost endless multiplication of rates which could find no excuse save the use which might be made of the article transported.

Territorial Classification Upheld.

In an opinion by Commissioner Prouty, the Commission decides the case of Desel-Boettcher Co. vs. Kansas City Southern and others. For the purpose of naming rates to various points in Texas, stations on the Kansas City Southern are grouped in territories as follows: South from Kansas City all stations up to, but not including Siloam Springs, are in Kansas City territory, while Siloam Springs and stations for a certain distance south are embraced in Little Rock territory. The carriers transferred Siloam Springs from Little Rock territory into Kansas City territory. The complainant alleged that this change, resulting in an advance of the rates on green apples in carloads from 49 cents to 58 cents per 100 lbs. from Siloam Springs to Houston, Tex., was unwarranted. The Commission holds that group rates must of necessity result in a certain amount of discrimination, but they should produce as little discrimination as possible; and that, upon the facts of this case, the change of Siloam Springs from the Little Rock group to the Kansas City group did not result in undue discrimination.

Passenger Rates on the St. Louis & North Arkansas Upheld.

In an opinion by Commissioner Clements the case of the Railroad Commission of Arkansas vs. the St. Louis & North Arkansas Railroad is decided. The petition of the Railroad Commission prayed for a reduction in the interstate passenger fares of this company between Arkansas points and interstate points. The complaint against the railroad company is dismissed and the Commission holds that the defendant road being unfinished, without through connections, not extravagantly managed, under the necessity of making extensions by public authority and in need of equipment and extension, and not earning sufficient to more than meet its operating expenses, and fixed charges not having been shown to be excessive, should not be required to transport interstate passengers at the same rates per mile as are finished, well-equipped and prosperous roads.

Moultrie Gets Better Rates.

The Interstate Commerce Commission, in an opinion by Commissioner Clements, has announced its decision in the case of Southern Grocery Company and Holmes-Hartsfield Company vs. Georgia Northern Railway and others. The complaint alleged that the carrier's rates, which are higher from Louisville, Cincinnati, Memphis and Nashville to Moultrie, Ga., than from the same points of origin to Tifton, Valdosta, Quitman, Thomasville and Fitzgerald, Ga., are unreasonable. The Commission decides that the circumstances and conditions surrounding transportation of freight by the carriers from such points of origin to Moultrie are not substantially dissimilar from those from such points of origin to said other nearby Georgia points, and that the practice of charging such higher rates to Moultrie is unjustly discriminatory, unreasonable and unlawful; and the Commission further decides that the just and reasonable practice would be to charge for such transportation to Moultrie the same rates from such points of origin as are charged therefrom to Tifton, Valdosta, Quitman, Thomasville and Fitzgerald. An order in accordance with such decision is entered.

The South Versus New England Again On Cotton Rates.

The Interstate Commerce Commission in an opinion by Commissioner Prouty has announced its decision in the case of the China & Japan Trading Co. and others against the Georgia Railroad and other lines forming through routes to the Pacific coast. The carriers' rates on cotton-piece goods from New England mills through Pacific coast points to the Orient is $11.25 for 40 cu. ft. of measured space, equivalent to about 85 cents per 100 lbs. Through rates on the same articles from Southern mills over the same route is $1.25 per 100 lbs. On complaint that this adjustment is unreasonable in itself and also discriminates against Southern mills in favor of New England mills, the Commission holds that the complaint is not sustained. The evidence of complainants strongly tended to show that an illegal agreement to advance rates on cotton-piece goods was made by transcontinental lines, and that the advanced rates were put in under that agreement; but it is not necessary to pass upon that question, because even if it were answered in favor of complainant the Commission would still be of opinion that this would afford no ground for either reducing the rate from Southern mills or awarding reparation. The mere fact that the advance was the product of an unlawful combination will not justify the setting aside of such rate if the Commission is of the opinion that such rate is not unreasonably higher than the previous rate.

Lower rates from New England than from the South on cotton products were upheld by the Commission in the case of Enterprise Manufacturing Co. et al. vs. Georgia Railroad et al. decided May 1, 1907. This decision was quoted in part and commented on in the *Railroad Gazette* of June 28, 1907, under the editorial, "The Working of the Rate Law."

TRADE CATALOGUES.

Chicago, Burlington & Quincy.—A pamphlet issued by the passenger department takes as its text, "How can you afford not to visit Yellowstone Park?" and makes out a strong case. It points out that it is not necessary in touring the Yellowstone to endure such hardships as many think of as being inseparable from the trip; also that the park is not merely a show place to be rushed through, guide book in hand, in a few days, but is also an excellent region for rest, both climate and diversions being salubrious. The pamphlet, which includes a large map of the park, then goes on to describe in detail the hotels, the coaching tours and excursions, the fishing and the natural phenomena for which the park is best known. It also gives suggestions as to what to wear and take and the cost of tours from different cities of the Middle West. Another of the company's folders describes a two weeks' tour via Denver and Colorado Springs through the Yellowstone Park and return.

Flexible Metallic Hose.—Bulletin 25 of the New York Flexible Metallic Hose & Tubing Co., New York, illustrates and describes "Nyflexmet" lead covered flexible metallic hose and tubing. This form of hose is built up of spirally twisted, ribbon-like strips of pliable steel or copper, having the edges formed into interlocking lips, the joints of which are packed with asbestos or rubber. For special purposes where it is required to resist corrosion, as for example, gas mains, it is furnished with an outer casing of lead. For water mains and similar purposes it is made with both an inner and outer lead tube. All sizes from ⅛ in. to 12 in. internal diameter are furnished and the lightest construction is made to stand a pressure of 500 lbs. per sq. in.

Coupler Repair Parts.—The McConway & Torley Co., Pittsburg, Pa., has prepared a small pamphlet containing illustrations and information for ordering all repair parts for Janney, Kelso and Pitt couplers, and also Buhoup three-stem buffer equipment. The pamphlet is intended for distribution among car repairmen and purchasing agents to aid them in ordering repair parts direct from the makers instead of from irresponsible outside companies whose product is often of inferior quality and not perfectly interchangeable. It will be sent to anyone interested on application.

The Bucyrus Co., South Milwaukee, Wis., has reprinted the President's message on the Panama Canal, communicated to Congress last December, in a handsome book which it is distributing. The printing is in brown on cream paper, with paragraph headings in red, and there are fine half-tone illustrations, also in brown. The cover is flexible brown board with gold embossed lettering, tied with brown silk cord. There is also a map of the Isthmus showing the canal route. The Bucyrus Co. has furnished all the steam shovels thus far ordered by the Canal Commission.

MANUFACTURING AND BUSINESS.

It is said that the Pullman Company is figuring on plans for a steel car plant at Hammond, Ind.

The Union Refrigerator Transit Co. has ordered Neponset insulating paper for repairs and new work on refrigerator cars. The paper is made by F. W. Bird & Son, East Walpole, Mass.

Clarence Price has been elected a Vice-President of the American Car & Foundry Company, New York. William M. Hager, Assistant Secretary, has been elected Secretary, succeeding D. A. Bixby.

G. M. Genter, Jr., has been appointed Assistant Engineer in charge of estimating and drafting in the reinforced concrete department by the General Fireproofing Company, Youngstown, Ohio.

H. M. Beugler, formerly Superintendent of Railways for Ford Bacon & Davis' operating department, operating the Newman properties in Houston, Tex., Memphis, Little Rock, Birmingham, Nashville, Knoxville, has gone to Dodge & Day, Philadelphia and New York.

The exhibit of the American Blower Co., Detroit, Mich., at the Atlantic City conventions contained a mystifying novelty which attracted much attention. A high-pressure blower, running at speed and emitting a blast of air at high velocity, held suspended about 4 ft. from the outlet and at an angle of 45 deg. from the perpendicular, a light sphere about 12 in. in diameter. Observers were asked to explain why the sphere remained at that point instead of flying off into the ocean, but it is claimed no satisfactory solution was advanced by the engineers and others who saw it.

Iron and Steel.

About 3,000 tons of steel will be needed for the new shops of the St. Louis & San Francisco, at Springfield, Mo.

It is reported that the Atchison, Topeka & Santa Fe has given an order to the Bethlehem Steel Corporation for 40,000 tons of rails to be delivered in 1908. The price, it is said, is above $30 a ton.

OBITUARY NOTICES.

Daniel Jones, formerly Comptroller of the Philadelphia & Reading, died on June 24 at his home at Oaklane, Pa. Mr. Jones was 61 years old, and had been retired on a pension in January, 1905.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

Canadian Pacific.—A. D. MacTier, General Fuel Agent, has been appointed Assistant to the Vice-President, with office at Montreal. Thomas Britt has been appointed Acting General Fuel Agent, with office at Montreal.

Central of Georgia.—Charles Steele and George G. Haven have resigned from the Board of Directors. Oakleigh Thorne, Marsden J. Perry and William F. Sheehan have been elected Directors.

Chicago, Milwaukee & St. Paul.—Walter P. Bliss has been elected a Director, succeeding Herman S. Leroy.

Delaware & Hudson.—Clifford Stanley Sims, who succeeded A. I. Culver as Second Vice-President and General Manager, was born in 1868 at Prairie Ridge Plantation, Ark. He was educated at Mount Holly, N. Y., and in 1885 immediately after graduation began railroad work in the Engineering department of the Pennsylvania. In 1888 he was made assistant supervisor of the Pennsylvania Lines West at Cleveland, Ohio. Two years later he was appointed Assistant Engineer of Maintenance of Way at Fort Wayne, Ind., and in 1894 was made Acting Assistant Engineer of Motive Power. Next year he was promoted to be Engineer of Maintenance of Way at Toledo, Ohio, and in 1896 was transferred to Allegheny, Pa., with the same title. Three years later he was made Engineer of Maintenance of Way of the Chicago Terminal division, and in 1901 was appointed Superintendent there. The next spring he went to the Baltimore & Ohio as General Superintendent at New York, and in 1903 was made General Manager. In 1905 he went to the Erie, where he remained until he went to the Delaware & Hudson.

C. S. Sims.

New York Public Service Commissions.—The Commissioners appointed for the First district, consisting of New York, Kings, Queens and Richmond counties, are: William R. Willcox, of New York, Chairman; William McCarroll, of Brooklyn; Edward M. Bassett, of Brooklyn; Milo R. Maltbie, of New York, and John E. Eustis, of The Bronx. The Commissioners for the Second district, which includes all the other counties in the state, are: Frank W. Stevens, of Jamestown, Chairman; Charles Hallam Keep, of Buffalo; Thomas Mott Osborne, of Auburn; James E. Sague, of New Hamburg, and Martin S. Decker, of New Paltz.

Illinois Central.—See Yazoo & Mississippi Valley.

New York, New Haven & Hartford.—Charles M. Pratt and Lewis C. Ledyard, of New York, and Richard Olney, of Boston, who were recently elected Directors, have resigned.

Yazoo & Mississippi Valley.—I. G. Rawn, Vice-President of the Illinois Central, has been made also Vice-President of the Yazoo & Mississippi Valley, in charge of construction and operation.

Operating Officers.

Chicago & Alton.—William L. Derr, Superintendent at Bloomington, Ill., has resigned to become General Superintendent of the New York City Railway.

Chicago, Milwaukee & St. Paul.—J. H. Foster, Superintendent at Marion, Iowa, has been appointed Assistant General Superintendent at Minneapolis, succeeding H. B. Earling, promoted. W. B. Foster, Superintendent of the River, Chippewa Valley and Wabash divisions, succeeds J. H. Foster. B. T. Van Vliet, Superintendent of the Hastings and Dakota divisions, succeeds W. B. Foster, with office at Minneapolis. G. A. Van Dyle succeeds Mr. Van Vliet, with office at Minneapolis.

Illinois Central.—See Yazoo & Mississippi Valley.

New York Central & Hudson River.—Clinton Lloyd Bardo, who was recently appointed Superintendent of Grand Central Station and the Electric division, was born at Montgomery, Pa., in 1867. He began railroad work in 1885 as an operator on the Pennsylvania. The next year he worked as operator on the Philadelphia & Reading, and then went to the Tidewater Oil Company as operator and supply agent in the Construction department at Mauch Chunk, Pa. In 1887 he went to the Lehigh Valley as operator, being later made train despatcher. In 1892 he was appointed Assistant Trainmaster of the Wyoming division, and after a few months was made Trainmaster of that division. He was transferred to the New York division in 1901, and in 1904 went to the New York Central as Freight Trainmaster of the New York division. He was appointed Assistant Superintendent of this division in 1905, where he remained until his recent promotion.

C. L. Bardo.

St. Louis, Iron Mountain & Southern.—John William Dean, who was recently appointed Superintendent at De Soto, Mo., was born on January 15, 1867, in Lafayette County, Mo. After a public school education, he began railroad work in 1878 as a messenger boy on the Chicago & Alton. He served as operator, brakeman and agent on the Kansas City, Springfield & Memphis, now part of the Frisco Lines, and then went to the Missouri Pacific as operator and despatcher. After being operator and brakeman on the Southern Pacific, he went in 1887 to the Atchison, Topeka & Santa Fe as operator. He was made successively despatcher, chief despatcher, yardmaster and Trainmaster, and then in 1902 was made Trainmaster of the Denver & Rio Grande. After being appointed Superintendent of Terminals on this road, he went to the Colorado & Southern in 1903 as Superintendent. From 1904 to 1905 he was Superintendent of Terminals at Mexico City of the National of Mexico, and then went to the Illinois Central as Trainmaster of Ter-

J. W. Dean.

minals. He went to the St. Louis, Iron Mountain & Southern in September, 1905, as Superintendent of Terminals at Little Rock, Ark., and on February 1, 1906, was appointed Superintendent at Van Buren, Ark., where he remained until his recent transfer.

Norfolk & Western.—The lines of this company are now operated in two general divisions. A. C. Needles, heretofore General Superintendent of the entire road, has been appointed General Superintendent of the Eastern General division, consisting of all lines east of Bluefield, W. Va., including Bluefield terminals, with office at Roanoke, Va. George P. Johnson, Superintendent at Portsmouth, Va., has been appointed General Superintendent of the Western General division in charge of all lines west of Bluefield, including Bluefield terminals, with office at Bluefield. E. A. Blake, Superintendent at Roanoke, Va., succeeds Mr. Johnson. James P. Carey, Assistant Superintendent at Bluefield, succeeds Mr. Blake.

Northern Pacific.—B. E. Palmer, Assistant General Superintendent at Tacoma, Wash., has been appointed General Superintendent of Western lines, from Trout Lake, Mont., west. J. G. Cutler, General Superintendent of the Washington & Columbia River, has been appointed Superintendent of the Northern Pacific at Pasco, Wash.

Tehauntepec National.—J. N. Galbraith, General Manager, has resigned. W. B. Ryan, Vice-President, has been appointed also General Manager. H. W. Morris, Assistant to the General Manager, has been appointed Assistant to the Vice-President and his former office has been abolished. The offices of both are at Rincon Antonio, Oaxaca.

Washington & Columbia River.—See Northern Pacific.

Yazoo & Mississippi Valley.—F. B. Harriman, General Manager of the Illinois Central, has been appointed also General Manager of the Yazoo & Mississippi Valley.

Traffic Officers.

Northern Pacific.—S. B. Calderhead, General Freight and Passenger Agent of the Washington & Columbia River, has been appointed General Agent of the Northern Pacific, with office at Walla Walla, Wash.

Philadelphia & Reading.—E. B. Crosley has been appointed Coal Freight Agent, with office at Philadelphia, succeeding John H. Jones, retired.

St. Louis & San Francisco.—E. T. Willcox, Division Freight Agent at Birmingham, Ala., has been appointed Assistant General Freight Agent at Memphis, Tenn.

Seaboard Air Line.—C. D. Wayne, chief clerk in the General Passenger Agent's office, has been appointed Assistant General Passenger Agent, with office at Portsmouth, Va.

Washington & Columbia River.—See Northern Pacific.

Engineering and Rolling Stock Officers.

Illinois Central.—H. R. Safford, Assistant Chief Engineer of this company and of the Yazoo & Mississippi Valley and of the Indianapolis Southern, has been appointed to the new office of Chief Engineer of Maintenance of Way of the three companies, with office at Chicago, and the office of Assistant Chief Engineer has been abolished.

Indianapolis Southern.—See Illinois Central.

Yazoo & Mississippi Valley.—See Illinois Central.

LOCOMOTIVE BUILDING.

The Portland & Seattle, being built by the Northern Pacific, is in the market for five switching locomotives.

Stanley, Merrill & Phillips have ordered one consolidation locomotive from the Baldwin Locomotive Works.

The Illinois Steel Company, Chicago, has ordered one heavy four-wheel saddle tank switching locomotive from the Baldwin Locomotive Works.

The Minnesota Land & Construction Company, Duluth, Minn., has ordered three locomotives from the American Locomotive Company.

The Galveston Wharf Co., Galveston, Tex., has ordered eight six-wheel switching locomotives from the American Locomotive Co., with cylinders 19 in. x 26 in.

The Sierra Madre Land & Lumber Company, as reported in the *Railroad Gazette* of February 15, has ordered two consolidation locomotives from the American Locomotive Company.

The Henry Cowell Lime & Cement Co., Cleveland, Ohio, is said to have ordered two four-wheel saddle tank locomotives and two six-wheel switching locomotives from the Baldwin Locomotive Works.

The Virginia & Southwestern, as reported in the *Railroad Gazette* of June 14, has ordered three simple consolidation locomotives from the American Locomotive Company for September, 1907, delivery.

General Dimensions.

Type of locomotive	Simple consolidation
Weight on drivers	154,300 lbs.
Weight, total	171,000 "
Diameter of cylinders	21 in.
Stroke of pistons	26 "
Diameter of drivers	51 "
Boiler, type	Straight top
" working steam pressure	200 lbs.
" heating surface	2,562.7 sq. ft.
" tubes, number	350
" " material	Shelby steel
" " outside diameter	2 in.
" " length	15 ft.
Firebox, length	120⅛ in.
Firebox, width	40⅞ "
Grate area	34 sq. ft.
Tank capacity for water	6,000 gals.
Coal capacity	11 tons

Special Equipment.

Air-brake	Westinghouse
Boiler check	Phillips
Boiler lagging	Johns-Manville
Injector	Nathan simplex
Lubricators	Franklin
Piston rod packing	United States
Valve rod packing	United States
Safety valve	Crosby
Sanding devices	Coates
Sight-feed lubricators	Nathan Bull's-eye
Steam gages	Crosby
Tires—driving wheel	Latrobe

CAR BUILDING.

The New York City Railway is figuring on some new street cars.

The Duluth, Missabe & Northern is figuring on eight passenger cars.

The Northwestern Elevated, Chicago, is in the market for 40 cars.

The Oregon & Eureka is in the market for 10 flat cars of 60,000 lbs. capacity.

The Missouri, Oklahoma & Gulf is in the market for 200 coal cars of 80,000 lbs. capacity.

The Marquette & Southeastern has ordered 20 flat cars from the Hicks Locomotive & Car Works.

The Chicago & Eastern Illinois has ordered 2,000 drop bottom coal cars of 100,000 lbs. capacity.

The Chicago, Burlington & Quincy is asking prices on 2,000 steel gondola cars of 100,000 lbs. capacity.

The Pere Marquette, it is understood, has ordered 800 freight cars from the American Car & Foundry Company.

The Chicago, Lake Shore & Eastern has ordered 400 steel underframe box cars of 100,000 lbs. capacity from the Western Steel Car & Foundry Company.

The Tampa & Sulphur Springs Traction Company, Tampa, Fla., has ordered six double truck, 42-ft. open cars from the McGuire, Cummings Manufacturing Company.

The Armour Car Lines, Chicago, as reported in the *Railroad Gazette* of June 28, has ordered 35 tank cars of 80,000 lbs. capacity from the Bettendorf Axle Co., for September delivery. These cars will be 31 ft. long and 9 ft. wide, over all. The special equipment includes Bettendorf bolsters.

The Morris & Co. Tank Car Line, Chicago, as reported in the *Railroad Gazette* of June 28, has ordered 10 tank cars of 80,000 lbs. capacity from the Bettendorf Axle Co., for September delivery. These cars will be 31 ft. long and 9 ft. wide, over all. The special equipment includes:

Bolsters	Bettendorf
Brake-beams	Damascus
Draft rigging	Cardwell
Dust guards	Harrison
Journal boxes	Bettendorf
Trucks	Bettendorf

The Buffalo & Lake Erie, as reported in the *Railroad Gazette* of June 14, has ordered 25 combination baggage and passenger cars, with seating capacity for 50 people, from the Cincinnati Car Company. These cars will weigh 43 tons, and will measure 56 ft. 7 in. long, 9 ft. 4 in. wide and 13 ft. high, over all. The bodies will be of wood and the underframes of steel. The special equipment includes:

Brakes	Westinghouse
Couplers	Tomlinson
Curtain fixtures	Protected groove
Curtain material	Pantasote
Draft rigging	Tomlinson
Heating system	Hot water
Journal boxes	Symington
Light	Holophane globes
Springs	Triple elliptic
Trucks	Baldwin

The Arms Palace Horse Car Co., Chicago, as reported in the *Railroad Gazette* of June 7, has ordered 10 express horse cars of

50,000 lbs. capacity from the Pullman Co., for September delivery. These cars will weigh 110,000 lbs., and measure 60 ft. long, 10 ft. wide and 8 ft. 6 in. high, inside measurements. The special equipment includes:

Brake-beams	National-Hollow
Brake-shoes	Streeter
Brakes	Westinghouse
Brasses	Hewitt
Couplers	Tower
Draft rigging	Arms Palace Horse Car Co.
Journal boxes	Franklin
Paint	Heath & Milligan
Roofs	Monitor
Springs	Pittsburg Spring & Steel Co.
Trucks	Pullman
Wheels	Standard Steel Co.

RAILROAD STRUCTURES.

BETHLEHEM, PA.—At a recent meeting of the Commissioners of Lehigh and Northampton counties, the Bethlehem Borough officials, and the Lehigh Valley Transit Company, it was decided to build a new concrete arch 60 ft. wide and 475 ft. long to cost $100,000, to replace the bridge at Broad street.

CHANUTE, KAN.—It is said that the Atchison, Topeka & Santa Fe is about to build at this place the shops which it has had under consideration for a long time.

HARTFORD, CONN.—The terminals, yards and shop building of the Central New England, now part of the New York, New Haven & Hartford, were recently damaged by fire; loss $75,000.

LONDON, ONT.—The Grand Trunk, it is said, has plans ready, and has appropriated $50,000 for extensions to its shops here.

NEWCASTLE, N. B.—Local reports state that the Intercolonial has appropriated a large sum of money for bridge alterations on its lines.

RICHMOND, IND.—The Pennsylvania has bought land as a site on which it will put up a new freight house at a cost of $20,000.

ST. JOHN, N. B.—The New Brunswick Government has under consideration plans for a cantilever bridge to carry two tracks for electric cars, and a highway for street travel over, the St. John river at its mouth, to replace the present suspension bridge.

TAMPA, FLA.—The Tampa Northern has given a contract to H. L. Parker for a new freight house 55 ft. x 190 ft., to cost $22,000. The work to be finished by September.

TORREON, MEX.—The Mexican Central, it is said, will shortly start work on a new passenger station here. The proposed structure may also be used by the Mexican International.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ARKANSAS, LOUISIANA & GULF.—Preliminary surveys have been made by this company for its proposed line from Pine Bluff, Ark., south to Monroe, La., 133 miles, with a branch from Crossett to Rolfe Junction, nine miles. Most of the right of way has been secured. Grading contracts are reported let to J. Harris, of Monroe, for 3½ miles; and to J. A. Purdue & Co., of Pine Bluff, Ark., for 20 miles. Additional contracts covering about 42 miles are to be let shortly. (April 26, p. 598.)

ATCHISON, TOPEKA & SANTA FE.—The Arizona & California is reported finished and in operation from Wickenburg, Ariz., west to Parker on the Colorado river, 113 miles. Track was laid last year for 80 miles. Bids were recently opened for building a bridge over the Colorado river, to be ready for use by July, 1908. On the section west of the river grading is under way in California to Bengal, 92 miles, where connection is to be made with the main line of the Santa Fe. (March 15, p. 379.)

ATLANTA, GRIFFIN & MACON.—Local reports state that contracts were recently let, and that work is to be started at once on this line, projected from Atlanta, Ga., south to Macon, 90 miles. Surveys are also being made from Macon south to Albany, 100 miles. The office of the company is at Macon. (March 15, p. 379.)

BAUXITE & NORTHERN.—An officer writes that this company has grading finished and track laid for about one-third of the distance on the line it is building from Bauxite, Ark., north to Bauxite Junction, on the St. Louis, Iron Mountain & Southern, 2½ miles. The work included a bridge, which has been finished.

CHESAPEAKE & OHIO.—This company has stopped work on a number of important improvements. Contractors, Langhorne, Carpenter, Lane and Matthews were directed to cease work on their double-tracking contracts July 1. It is said that no more funds are at present available, and that continuance of work would depend on selling bonds at unfavorable prices. Two thousand men are affected by this order.

CHICAGO, INDIANAPOLIS & EVANSVILLE.—This company, which was incorporated in Indiana in 1905, to build a line from Evansville, Ind., north to Indianapolis and Indian Harbor, near Chicago, 346 miles, with a branch from Logansport, Ind., north to South Bend, 70 miles, has executed a mortgage to secure funds to carry out the work. Contracts are reported let to the Carter Construction Company, of Indianapolis, to build the entire main line. The necessary franchises, it is said, were obtained some time ago. W. M. Kenefick & Co., of Kansas City, are the financial backers of the project. The officers are: William Kenefick, President; J. B. Carter, Vice-President; C. A. Dunneen, Secretary, and R. Zenkere, Treasurer, Indianapolis, Ind. (June 14, p. 878.)

COLORADO, OKLAHOMA & SOUTHEASTERN.—An officer writes that the projected route of this proposed line is from Weatherford, Okla., on the Chicago, Rock Island & Pacific northwest via Lenora to Woodward, on the Atchison, Topeka & Santa Fe, 90 miles. A branch is also projected from the main line at Deevesville west to Gage, on the Atchison, Topeka & Santa Fe, 30 miles. P. A. McCarthy, Chief Engineer, Lufkin, Tex.

GRASSY CREEK & ELKHORN.—Organized to build a line from Grassy Creek, Ky., south to the mouth of Elkhorn creek, 16 miles; surveys under way. The incorporators include: W. F. Rapp and O. W. Litner, of Ironton, Ohio, and Leon Isaacson, of New York.

HEARD COUNTY.—Incorporated to build a line from Roanoke, Ala., on the Central of Georgia, northwest to Newnan, Ga., also on the Central of Georgia, 40 miles. Most of the right of way has been secured. Dr. J. W. Daniel, President, and Dr. W. S. Trent, Secretary, Franklin, Ga.

HOUSTON & BRAZOS VALLEY.—Work has been started on an extension of this road, formerly the Velasco, Brazos & Northern. The proposed route is from Anchor, Tex., north to a connection with the Trinity & Brazos Valley, near Houston. (April 2, p. 581.)

LORAIN & ASHLAND.—All the right of way for the proposed extension of this road from Wellington, Ohio, south to Loudonville, 39 miles, it is said, has been obtained, and work is to be started shortly. The company is planning to build about 62 miles this year. (March 15, p. 386.)

MEXICAN SOUTHERN.—A concession has been granted by the Mexican Government to James P. Taylor, of Mexico City, to build a line from Gomacho, on the Mexican Central, in the northern part of the state of Zacatecas, via Tecolote and Cedros to Bonanza; also to build a branch from Cedros to Mazapil and Salaverna. According to the terms of the concession, surveys must be started within six months, and 22 miles built each succeeding year until the entire road is finished; and all the work must be completed within six years. (May 31, p. 759.)

MEXICAN ROADS (ELECTRIC).—A concession has been granted to Dr. J. W. Lim, of Torreon, by the state of Coahuila, to build an electric line from Torreon east to Matamoras, about 6½ miles. Surveys are now being made and work, it is expected, will be started soon.

MINNEAPOLIS & ST. LOUIS.—The Minnesota, Dakota & Pacific, under construction from Conde, S. Dak., west to Le Beau, on the Missouri river, 115 miles, on which track was laid last year to Northville, 24 miles, is now in operation to Cresbard, 42 miles. (March 15, p. 387.)

MINNESOTA, DAKOTA & PACIFIC.—See Minneapolis & St. Louis.

MISSOURI ROADS.—A company is being organized by Frank Russell and other St. Louis capitalists to build a line to develop coal fields in Boone County.

MISSOURI RIVER & NORTHWESTERN.—This company, operating 34 miles of road from Rapid City, S. Dak., west to Mystic, recently incorporated the Wyoming Western, to build from Mystic, S. Dak., west to Buffalo, Wyo., 200 miles. The new company has a capital of $4,000,000 and offices at Rapid City. C. S. Crouch, V. E. Crouch, C. E. Fulton, J. S. Gantz and E. L. Hurlburt, all of Rapid City, are incorporators.

NASHVILLE, SHELBYVILLE & DECATUR.—Application has been made by this company for a charter to build a line from Nashville, Tenn., south to Decatur, Ala., about 115 miles. The incorporators include: W. G. Hill, H. C. Dyer and H. B. Cowan, of Shelbyville; W. Z. Dozier, of Fayetteville, and W. R. Hall, of Decatur.

NEW JERSEY ROADS (ELECTRIC).—Announcement is made that a company is being organized, with the backing of John H. Starin, C. S. Smith and W. Langdon, former members of the New York Rapid Transit Commission, to build a four-track elevated high-speed monorail line from Newark, N. J., to Jersey City.

NORTH & SOUTH TEXAS.—An officer writes that contracts are let to Cox & Chessher, of Groveton, Tex., for clearing the right of way, and to C. M. McConnico, of Lufkin, for other work on the line it is building from Groveton north to Cedar, about 21 miles. At Cedar connection is to be made with the Texas Southeastern, from which point trackage rights have been obtained to Lufkin, 14 miles. The

line will be laid with 60-lb. rails. P. A. McCarthy, Chief Engineer, Lufkin, Tex. (March 15, p. 388.)

National of Mexico.—This company is planning to change all its branch lines, aggregating over 400 miles, from narrow gage to standard gage. Work is well under way changing the gage between Gonzalez Junction and Acambaro, 54 miles, and when finished work will be started between Acambaro and Urapan, 143 miles. The company is also building on the northern end of its road a new branch from Jarita to coal fields near the Texas border at Columbia.

Oklahoma & Golden City.—Surveys, it is said, have been made by this company, and contracts may be let this month for building from Jefferson City, Mo., southwest to Pawhusa, Okla., about 270 miles, with a branch from the main line at Climax Springs in Camden County, Mo., south to Springfield, 67 miles. W. K. Palmer, Chief Engineer, Dwight building, Kansas City, Mo. (March 29, p. 468.)

Open River Railway & Navigation.—Surveys reported made and rights of way secured for a proposed 17-mile line, one end of which is at Holdman, Ore. Contracts for the work are to be let about October 1. C. E. Curry, Portland, Ore., is President.

Pennsylvania.—Under the name of the Pennsylvania Tunnel & Terminal Company, the Pennsylvania, New Jersey & New York and the Pennsylvania, New York & Long Island have been consolidated.

Pennsylvania Tunnel & Terminal.—See Pennsylvania.

St. Louis, Mountain Grove & Southern.—Incorporated in Missouri with $300,000 capital and office at Mountain Grove. The company proposes to build a line from Mountain Grove in Wright County, on the St. Louis & San Francisco, south to Bryant creek, in Ozark County, 30 miles. J. J. Hedges, J. H. Jarrett and E. L. Richardson, of Springfield; J. Allhands, of St. Louis, Mo., and P. M. Johnston, of St. Elmo, Ill., are directors.

Savannah, Augusta & Northern.—This company has given notice of an amendment to its charter so as to increase its capital stock from $8,000,000 to $11,000,000. The company was organized to build from Savannah, Ga., northwest to Rossville, about 330 miles, with a branch to Augusta, 30 miles. Contracts for some of the work are reported to have been let to J. W. Oliver, of Nashville, Tenn. (June 21, p. 917.)

Southern Pacific.—Local reports state that this company has plans made to establish a new route to avoid the marshes and sinks between Benicia, Cal., and Suisun. This is to be accomplished by abandoning the piers at Port Costa and the ferry from that point to Benicia. New piers are to be built at Rodeo, on Pinole Point, and a ferry run from that place to South Vallejo. From South Vallejo the route is over the existing line to Flosden, thence by a new line northeast through American canyon to Cordelia on the Napa Junction and Suisun line, connecting with the main line at Sacramento.

Velasco, Brazos & Northern.—See Houston & Brazos Valley.

Wyoming Western.—See Missouri River & Northwestern.

RAILROAD CORPORATION NEWS.

American Railways Co.—A syndicate consisting of Bioren & Co., Newburger, Henderson & Loeb and E. C. Miller & Co., all of Philadelphia, is offering at 96 and interest a block of $600,000, 10-year, collateral trust, 5 per cent. bonds, being part of an authorized issue of $2,500,000. The bonds are dated April 1, 1907.

Atchison, Topeka & Santa Fe.—See Eastern Oklahoma.

Broxton, Hazlehurst & Savannah.—See Fitzgerald, Ocilla & Broxton.

Chesapeake & Ohio.—This company has sold to Blair & Co., New York, $5,000,000 6 per cent., three-year notes; they are to be secured by the $10,000,000 general improvement and equipment 5 per cent. bonds, an issue of which will be authorized later. The proceeds of the sale of the notes are to go towards paying off floating debt and other current needs.

Chicago & Alton.—The Union Pacific and the Chicago, Rock Island & Pacific Railway Company have jointly agreed to guarantee that the Chicago & Alton will have at least $1,666,000 to spend on improvement work now under way, consisting particularly of track elevation at Chicago. The Chicago & Alton is to use its surplus for this purpose, and if this surplus is not enough, the other two companies will lend it money, up to the amount named, taking Chicago & Alton notes in return.

Chicago, Burlington & Quincy.—The lease of the Chicago, Burlington & Quincy Railroad to the Chicago, Burlington & Quincy Railway Company has been rescinded, and the railroad company has resumed the operation of the road. The railway company was organized in 1901 for legal reasons.

Chicago, Rock Island & Pacific.—See Chicago & Alton.

Colorado Southern, New Orleans & Pacific.—An agreement has been concluded by which this company will temporarily use the terminal facilities of the Kansas City Southern at Beaumont, Tex. The C. S., N. O. & P. has already trackage rights over the Kansas City Southern from De Quincy, La., to Beaumont. It will later build its own terminal.

Denver, Enid & Gulf.—See Eastern Oklahoma.

Eastern Oklahoma.—The Denver, Enid & Gulf, which was taken over by the Atchison last year, has been transferred to the Eastern Oklahoma, which operates most of the Atchison branch lines in Oklahoma.

Fitzgerald, Ocilla & Broxton.—This is the successor company to the Broxton, Hazlehurst & Savannah, which company owns the Ocilla & Valdosta. The entire line runs from Broxton, Ga., to Irwinville, 33 miles, with a five-mile branch to Fitzgerald.

Kansas City, Mexico & Orient.—This company is offering for subscription at par $400,000, first mortgage, 4 per cent. bonds of 1951. A bonus of $400 preferred stock and $400 common stock is given with each $1,000 bond. The proceeds of the sales are to be used to finish grading from Emporia, Kan., to Kansas City. It is expected to have the road in operation from Emporia to San Angelo, Tex., at the end of the year, and at that time also 65 per cent. of the line in Mexico will be ready for operation.

Kansas City Southern.—See Colorado Southern, New Orleans & Pacific.

Medford & Crater Lake.—See Pacific & Eastern.

Pacific & Eastern.—This company has been organized to own and operate the Medford & Crater Lake, which runs from Medford, Ore, to Eagle Point, 11 miles, and was sold at receiver's sale on May 11 for $82,500. The new company is to extend it to Butte Falls and Klamath Falls, 89 miles. The Rogue River Valley Railroad, which runs from Medford to Jacksonville, 6 miles, has been bought by the same interests. The new company has $1,000,000 authorized capital stock, of which $500,000 is outstanding and $1,000,000, 6 per cent. bonds of 1937 authorized, of which $200,000 is outstanding.

Pennsylvania, New Jersey & New York.—See Pennsylvania Tunnel & Terminal.

Pennsylvania, New York & Long Island.—See Pennsylvania Tunnel & Terminal.

Pennsylvania Tunnel & Terminal.—This company has been incorporated in New York State with $40,000,000 capital to take over the Pennsylvania, New York & Long Island, and the Pennsylvania, New Jersey & New York. (June 21, p. 918.)

Pittsburg, Fort Wayne & Chicago.—The New York Stock Exchange has listed $1,431,900 additional guaranteed, special improvement stock, making $38,806,400 outstanding. The stock was sold to the Pennsylvania Railroad to partially reimburse that company for motive power, rolling stock, additional tracks, track elevation and other improvements. The stock is guaranteed by the Pennsylvania Railroad; and the Pennsylvania Company, according to its last annual report, holds in its treasury $33,443,400 of it.

Public Service Corporation.—An initial quarterly dividend of 1 per cent. on the $12,500,000 outstanding capital stock of this company was paid on July 1. The company controls nearly all the street railways of northern New Jersey, and gas and lighting interests in the greater part of the state. It owns and operates 258 miles of road and controls about 200 miles more.

Rogue River Valley.—See Pacific & Eastern.

United Railways of St. Louis.—The Mississippi Valley Trust Company and Francis, Brother & Co., of St. Louis, are offering 95.54 and interest for $200,000, two-year, 5½ per cent. collateral trust notes due July 1, 1909, but subject to call after July 1, 1908. They are secured on $1,500,000 general first mortgage, 4 per cent. bonds and $500,000 preferred stock. The proceeds of the sale will be used for paying up the majority of the $1,500,000, 6 per cent. bonds of the Citizens' Railway, a subsidiary.

Union Pacific.—See Chicago & Alton.

Yosemite Valley.—N. W. Halsey & Co., New York, have sold the majority of the $3,000,000 first mortgage, 5 per cent. bonds of 1936 of this company, which was recently put in operation from Merced, Cal., on the Southern Pacific and the Atchison, to the Yosemite National park, 80 miles. The terminal is connected with the government roads in the park by a new stage road. The railroad is to be operated all the year round.